



The
First Book of Architecture by
ANDREA PALLADIO
translated out of Italian wth diuerse
other designes necessary to the art
of well building by
Godfrey Richards



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THE
FIRST BOOK
OF
Architecture :
BY
ANDREA PALLADIO.

Translated out of ITALIAN,
With an APPENDIX touching
DOORS and WINDOWS,
By PR. Le MUET Architect to the French King.

Translated into English by GODFREY RICHARDS.
The Whole illustrated with above Seventy Copper Cuts.

ALSO
*Rules and Demonstrations, with several Designs, for the Framing
of any manner of Roofs, either Above Pitch, or Under Pitch,
whether Square, or Bevel, never before Published: By that
Ingenious Architect Mr. William Pope of London.*

WITH
*Designs of Floors of Variety of Small Pieces of Wood Inlaid,
lately made in the Palace at Somerset-House; a Curiosity never
practised before in England.*

*The Eleventh Edition, Corrected and Enlarged: With a new Model
of the Cathedral of St. Paul, London, as it is now Rebuilt.*

LONDON:
Printed for EDW. MIDWINTER at the Looking-
Glass on London-Bridge. 1729.

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The *PREFACE* to the *READER*.

THE Subject of this Translation, being ARCHITECTURE, doth, in the Opinion of Sir Hen. Wotton, need no Commendation, where there are Noble Men or Noble Minds: Therefore I shall only give you an Account of the Author's, and my own Concernments herein: He was Andrea Palladio a Famous Architect of Italy, where taking Notice of the Irregularities and Deformities in Building, introduced by Invasions of the Goths, and other Barbarians; to prevent those Inconveniencies for the future, he thought fit to Instruct the World in the Rules and Practices of the Learned Antients; having Opportunity to observe the Foot-steps of their Labours, ev'n at Rome itself, where being the greatest Concourse of Noble Men and Noble Minds, they spared neither Care nor Cost in Building: And in Imitation of them, our Author is exact in his Directions touching every Material, as in the Choice of Stone, Timber, Metals, Sand, Lime, Brick, &c. what good, and what not, how to be prepared, and put in use. 'Tis observ'd, how careful they were in making their Brick and Lime, not forbearing the hardest Stone; for as Sir Hen. Wotton observeth, that the Italians to this Day, and much more the Antients, did burn the firmest Stone, and ev'n Marble itself, where it was plentiful, which in time became Marble again, or at least of indissoluble Durity, as appeareth in the standing Theatres: And other Learned Men have required that all the Timber be cut out of the same Forest, all the Stone out of the same Quarry, and the Lime be made out of the same Stone of which the Building is intended, imagining that they will Sympathize and Joyn better, by a kind of Original Kindred. But instead of this Curiosity, we too often make Lime without any great Choice, and of Refuse Stuff, which is an English Error of no small Moment in our Buildings. After these Particulars, our Author proceeds to treat of the Five Orders of Columns, whose Members and Proportions, as he hath laid them down, are, by the Judicious, esteemed the most Excellent in their kind; and for some of their Terms, which I have changed, it was not without the Advice of Skilful Artists, thereby to conform to those Terms most familiar to our Workmen.

To these are added Designs of Doors and Windows, by Pr. Le Muet Architect to the French King, which I thought good to present, (Palladio only discoursing of them) they being well approved by all Artists,

The PREFACE.

both for the Manner and Proportions, and the same which are at the Louvre at Paris; and out of him, I have given the Proportion of Halls and Chambers, tho' a little differing from Palladio, because most agreeing to the present Practice both in England and France. And for the same reason, I do, instead of Mons. Muet's Designs of Frames of Houses, put in such as are used in England, by the Direction of some of our ablest Architects; which (I hope) will be grateful, and very useful, not only to our Artists, but Gentlemen and Others which may have Occasion to Build; giving an Account of all the Names proper to each Member and Principal of the House; and also shew the Manner of Framing, with their several Scantlings and Butments.

Altho' we want not such Ingenious Artists, whose Names deserve to be celebrated for many standing Examples of their Skill, which do better deserve Description, than many published with much Pomp, beyond the Seas; yet we have but few Books which we can recommend to you, besides the Excellent Discourses of Sir H. Wotton, and John Evelyn Esq; the former on the Elements of Architecture; and the latter, in his Account of Architecture and Architects, (added to his elegant Translation of the Parallel) where they have comprised fully and clearly the most weighty Observations of the Art in general: The Studious will need only to serve himself of the particular Parts thereof, according to his own Occasions.

And such Pieces as are here presented, the Reader cannot think unseasonable, being against the Rebuilding of so great a City as London, wherein the King having shewn his particular Care of keeping the Trade in its former Channel, by fixing the Exchange, Custom-House, &c. on their Old Foundations; and their Laws having provided for such a Way of Building as may joyn together (what our Authors requires to be observed by every Undertaker) Accommodation, Handsomness, and Lastingness, and prevent that Deformity and Danger which we have formerly been liable to, by Irregular and Slight Buildings, Narrow Streets, Intolerable Encroachments, Fetting Windows, and what not, that might make it Combustible. I hope both Old and Young do rejoyce at the Rebuilding of London, a Second happy Restoration, inferior only to that of his Majesty's Person and Government.

Godfrey Richards.





The South Prospect of S^T PAUL'S Cathedral London.



I
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The First Book of ARCHITECTURE:

By *ANDREA PALLADIO.*

CHAP. I.

*What ought to be Considered and Prepared,
before you begin to Build.*

 **B**EFORE you begin to Build, you ought carefully to consider every Part of the Foundation and Ground-work of the Building which is to be Raised. Three Things in a Building (as faith *Vitruvius*) ought to be consider'd, without which it will not deserve Commendation; those are, Usefulness or Accommodation, Lastingness, and Handsomness: For that Work cannot be accounted Perfect, which is Useful but only for a short time, or not Convenient for a longer, or having these two, hath not also Decency: It will be Commodious, when every Part hath its due Place, and fit Situation; not below its Dignity, nor above what its Use requires; and they will be fitly disposed, when the Galleries, Halls, Chambers, Cellars, Granaries are in their proper Places. As for the Lastingness, you regard that, when all the Walls are right by the Line, thicker below than above, and have good and sufficient Foundations: And

Of Architecture.

And besides, the Pillars above must be directly over the Pillars below ; and all the Apertures (as Doors and Windows) must be one above the other, so that the Solid be upon the Solid, and the Vacant upon the Vacant. The Handsomness will arise from the fair Form and Correspondence between the Whole and its Parts, of the Parts among themselves, and of them to the Whole ; because that a Building ought to appear an intire and perfect Body, wherein each Member agrees with the others, and all the Members be necessary to what you design:

These Things consider'd in the Design and Model, you ought then diligently to calculate all the Charge that may arise, and make timely provision of Money, and prepare what Materials shall seem requisite ; so that in Building, nothing may be deficient, or hinder the Compleating of the Work : It being no little Praise to the Builder, nor small Advantage to the Work, that it be finished with due Expedition, and that all the Walls be at once laid out, and equally dispatched ; from whence there will be none of those Clefts which usually are seen in Fabricks finish'd unequally, and at divers times.

And therefore having chosen the most skilful Artists that you can get, that so the Work may be the better carried on by their Advice, you are to provide Timber, Stone, Sand, Lime, and Metal ; concerning which Provision, you shall have some Advertisements ; as, to frame the Joists of the Hall and Chambers, provide your self with so many Joists, as, when framed, there may remain between them the Space of a Joist and half.

In like manner concerning Stone, you are to take Notice, that to make the Jaums of Doors and Windows, you are not to have Stone bigger than a Fifth, or less than a Sixth part of the Light ; and if you intend to adorn the Buildings with Pillars or Pilasters, make the Bases, Capitols, and Architraves of Stone, and the other parts of Brick.

Besides, as for the Walls, you are to consider, that they ought to diminish according as they rise ; which Instruction will state the Account right, and lessen great part of the Charge : And because all these Parts may be discoursed of in their particular Places, it shall suffice to have here given this general Advice, which is as a rough Draught of the whole Building.

But



But besides the Quantity, you are also to consider the Quality and Goodness of the Materials, to chuse the best: Experience gained from the Buildings of others, will be a great Help, because thereby we may easily know how to determine what is fit and expedient to our own Purpose. And although *Vitruvius*, *Leon Battista*, *Alberti*, and other excellent Writers, have taught what is requisite in the Choice of Materials; yet that nothing may be wanting in these Books of mine, I shall speak of some, confining my self to the most necessary.

C H A P. II.

Of Timber.

Timber (*Vitruvius* hath it, *Book II. chap. 9.*) ought to be Fell'd in *Autumn*, and through all the *Winter*, because then the Trees recover from the Root that Strength and Soundness which in the *Spring* and *Summer* was dispersed into Leaves and Fruit; and you are to cut them in the Wain of the Moon, because the Moisture which is most apt to rot Wood, is then consumed; from whence there will not come the Worm to hurt it. It should be cut but to the middle of the Pith, and so left until it be dry; because by Drops, there will pass away that Moisture which would cause Putrefaction: Being cut, let it be laid in a Place free from the Extremity of the Sun, Wind, and Rain; and those ought chiefly to be kept dry which are of spontaneous growth; and to the end that they may not cleave, but dry equally, you are to daub them over with Cow-dung: It should not be drawn through the Dew, but in the Afternoon; nor to be wrought being very wet, or too dry; because the one makes it apt to rot, the other hard to work; nor will it in less than Three Years be dry enough to use in Planks, Doors, and Windows. It is convenient for those who are about to Build, to inform themselves from Men skilful in the Nature of Timber, what Wood

Of Architecture.

is fit for such Use, and what not. *Vitruvius*, in the Chapter above mention'd, gives good Instructions; and so other Learned Men, who have written thereof at large.

C H A P. III.

Of Stone.

Some are *Natural*, some *Artificial*: The *Natural* are hewn out of the Quarry, and are either to make Lime, or to build Walls: Of those which are used for Lime, shall be spoken hereafter. Those of which Walls are built, are either Marble and hard Stone, or else soft and pliant. Marble and hard Stone is to be wrought as soon as digg'd; for it will be at that time more easy to work, than when it hath remain'd a-while in the Air; seeing the longer they are out of the Quarry, they become the harder, and must suddenly be put in hand. But the softer the Stone, (especially where its Nature and Sufficiency is not well understood, as when 'tis digg'd in a Place from whence formerly none has been taken) it ought to be digged in *Summer*, and exposed to the Air, and not to be used within two Years: It must be digg'd in *Summer*, to the end that not being used to Wind, Rain, and Frost, it may by degrees grow hard, and enabled to resist those Injuries of the Weather; and it should be left so long, that those which have been prejudiced may be put in Foundations; and the others not spoiled (upon trial) are to be used above Ground in Buildings, because they endure longest.

Artificial Stones, are, from their Form, commonly call'd *Quadrels*; these are made of Chalky, Whitish, and Pliable Earth: you must by all means avoid that which is Gravelly and Sandy; the Earth must be digg'd in *Autumn*, and temper'd in *Winter*, and so they may be well made in the *Spring*: but if Necessity forces you to make them in the *Winter*, or *Summer*, cover them in *Winter* with dry Sand, and in *Summer* with Straw:
When

When made, they require a longer Time to dry ; and 'tis best that they dry in the Shade, so that not only the Outside, but the Middle, and all Parts may be equally hardened ; which cannot be done in less than two Years. They are made bigger, or less, according to the Quality of the Building, and the Use to which they are intended ; therefore the Antients made their Bricks for Publick and great Buildings larger than for small and Private : The Bigger sort ought to be hollowed in many Places, that so they may dry and bake the better.

CHAP. IV.

Of Sand.

There are three sorts of Sand, that is to say, Pit-Sand, River-Sand, and Sea-Sand. Pit-Sand is, of all, the best, and is Black, White, Red, or Cindry, which is a sort of Earth burnt by Fire, inclosed in the Mountains, and digged up in *Tuscany*. There is also digged in *Terra di Lavoro*, in the Territories of *Baio* and *Cuma*, a Sand called (by *Vitruvius*) *Pozzolana*, which suddenly knits together in Water, and makes Buildings very strong : It hath been found, by long Experience, that of all Pit-Sand, the White is the worse ; and of River-Sand, that from the Stream which is found in the Falls of Water, is the best, because it is more purged. The Sea-Sand is worst of all, and blackens and shines like Glass ; but that is better which is nearest the Shore, and bigger. The Pit-Sand, because 'tis fat and tough, (but apt to cleave) is therefore us'd in Walls and long Vaults. The River-Sand is very good for the Covering or Rough-casting of Walls. Sea-Sand, because 'tis soon wet and soon dry, and moulders away by reason of the *Salt*, therefore is unfit to bear Weight. All Sand is best in its Kind, if being squeezed and handled, it crackles, and if being put upon a White Cloth, it neither stains, nor leaves it foul : That is bad, which is mingled with Water

Water, makes it dirty and muddy, and which has for a long time been in the Air, Sun, Moon, and Frost ; because it will retain much Earth and rotten Humour, apt to bring forth Shrubs and wild Fig-trees, which are greatly hurtful to Buildings.

CHAP. V.

Of Lime, and how to work it.

STONES whereof Lime is made, are either digg'd out of the Hills, or taken out of the Rivers: All Stones of the Hills are good which are dry, without any Moisture, and brittle, having no Material in it, which when it passeth the Fire, shall leave the Stone less ; therefore that Lime will be best, which is made of the hardest, sound, and white Stone, and being burnt, remains a third part lighter than its Stone. There are also certain sorts of Stone, the Lime whereof is very good for the setting of Walls. In the Hills of *Padua* they dig a rugged Stone, whose Lime is very good in Works which lie open, and in the Water ; because it presently hardens, and endures very long. All digged Stones are better to make Lime than the gathered ; and from a shady and moist Pit, rather than a dry : The White is better to work than the Brown. Stones which are gather'd in Rivers and Brooks, that is to say, Pebbles, make excellent Lime, and very white and neat work, therefore 'tis generally used for Finishing of Walls. All Stones, as well of the Hills as Rivers, are sooner or later burnt, according to the Fire which is given them ; but ordinarily they are burnt in Sixty Hours : Being burnt, wet them ; but don't pour on the Water all at once, but at divers times, and frequently, (that they may not burn) 'till they be well Temper'd : Afterwards put them in a moist and shady Place without any Mixture, only cover them lightly with Sand ; and by how much the more thoroughly they are steeped, so much the more rough and better they will be ; except those which are

are made of rough Stones, as the *Paduan* ; because they, as soon as they are wet, must be wrought, otherwise they waste and burn away ; whence they will not hold, but become useles. For to make the Morter, you must so mix the Sand, that taking of Pit-Sand, you must put three parts thereof with one of Lime ; if River or Sea-Sand, two parts thereof with one of Lime.

C H A P. VI.

Of Metals.

THE Metals used in Buildings, are Iron, Lead, and Copper : Iron serves to make Nails, Hinges, and Chains to fasten the Doors, to make Doors themselves, Grates, and the like Works. It is no-where found and digged pure ; but when digged, is purged by the Fire, to the end it may be so melted that it may run, and that before it be cool the Foulness may be taken away ; but after it is purged and cool'd it heats well, and becomes soft, and easy to be wrought and beat out with a Hammer. But it will not easily melt, if it be not again put into a Furnace made for that Purpose : If being red-hot, it do not work nor yield to the Hammer, it wastes, and is spoil'd. 'Tis a sign of the Goodness of Iron, if in the Mass you see the Veins continued straight, without interruption, and if the Ends of the Piece be clean, and without Soil ; because the said Veins shew if the Iron be without Knots and Puffs ; and you may understand the Middle by the Ends. Being wrought into Plates square, or any other figure, if the Sides be even, you may conclude 'tis all alike Good, having equally endured the Hammer.

With Lead they cover stately Palaces, Churches, Towers, and other Publick Buildings, and Gutters and Pipes to convey Water ; and therewith they fasten the Hinges and Iron-work in the Jaums of Doors and Windows. There are three sorts thereof, White, Black, and of a Colour between both, and by

by some called Ash-colour; the Black is so called, not because 'tis really Black, but because being White, with some Blackness in it; therefore, in respect of the White, the Antients, with Reason, gave it that Name. The White is more perfect and precious than the Black; the Ash-colour is between both. Lead is digged either in great Lumps found by themselves, or in small Pieces, which shine with a certain Blackness, or else in very thin Flakes, amongst the Rocks, Marble and Stones. All sorts of Lead will easily run, because with the Heat of the Fire it melts before it is red-hot: But put it into a very hot Furnace, it loseth its Nature and Strength; for one part is changed into Litharge, and the other into Dross. Of these sorts of Lead, the Black is soft, and therefore easily wrought with the Hammer, and dilates much, and is very heavy. The White is harder and lighter; the Ash-colour is much Harder than the White, and of middle Weight between both.

With Copper sometimes they cover Publick Buildings; and the Antients made Nails, or Bolts, which fastened in the Stones above and below, kept the Stones from falling out of order, and the Clasps or Hooks placed to hold two Stones together; and they used these Nails and Clasps, because that Buildings, which can't possibly be made without many Pieces of Stones, may (by being thus join'd and bound together) as it were become one Stone, and so more strong and durable. They also made Nails and Clasps of Iron, but more often of Copper, because they will last longer, not being so subject to rust. Also they made Letters for Inscriptions, which they placed on the Borders of Buildings: And we read, that of this Metal were the Hundred famous Gates of *Babylon*; and in the Isles of *Cades*, the two Pillars of *Hercules*, Eight Foot high. That is esteemed the best, which, burnt and extracted from Mineral by Fire, is Red, inclining to Yellow, of a good Grain, and full of Holes; for that is a sign 'tis well purged, and free from Dross. Copper may be heated like Iron, and made liquid, so that it may be Cast: but in extreme hot Furnaces it will not endure the Force of the Flame, but totally consume. Altho' it be hard, nevertheless it submits to the Hammer, and dilates it self into thin Leaves; it is best preserved by Tar: And altho' it doth not rust like Iron, yet

yet it hath a kind of Rust, which is called *Verdigrease*, especially if it touch sharp and liquid Things; of this Metal, mixed with Tin, or Lead, or Latten, (which is also Copper) and colour'd with *Lapis Calimnaris*, is made a Metal commonly call'd Brass, which often-times Architects do use, as in Bases, Pillars, Capitols, Statues, and such-like. In Rome are four Columns of Brass, (as *St. Giovanni Lateranno*) of which one only has its Capitoll, and were made by *Augustus* of Metal which was taken from the Stems of Ships which he took in Egypt from *M. Antonio*: There remains also in Rome to this Day four Ancient Gates; which are those of the *Rotunda*, which formerly was the *Pantheon*; that of *St. Adriano*, which was the Temple of *Saturnus*; that of *St. Cosmo and Damiano*, which was the Temple of *Castor and Pollux*, or rather of *Romulus and Remus*; and that which is in *St. Agnes* without the Gate *Viminalis*: but the most beautiful of all these, is that of *St. Maria Rotunda*, wherein those Antients did endeavour to imitate by Art that kind of *Corinthian* Metal, in which the natural Yellow of Gold prevailed: For we read, that when *Corinth* was destroyed and burnt, (which now is called *Coranto*) thus they melted and mixed in one Mass Gold, Silver, and Copper; and Fortune tempered and made the Mixture of three sorts, which was afterwards called *Corinthian*; in one of them the Silver prevailed, whence it remained White, and very near it in Lustre: in another the Gold prevailed, and remained Yellow and of a Gold Colour; and the third was where all these three Metals were of an equal Temperament: And these Species have been since divers ways imitated.

Hitherto I have discoursed of those Things seeming most necessary to be Considered and Prepared before Building: It now remains that something be said of Foundations; the Materials whereof being prepared, the Work may be proceeded on.

C H A P. VII.

*Of the Qualities of Ground wherein
Foundations are to be laid.*

THE Base of the Building, is that which we call the Foundation, that is to say, the part which is under Ground, upholding the rest of the Building that is above Ground; therefore, of all the Errors which do happen in Building, those are the most pernicious which are committed in the Foundation, because they bring with them the Ruin of the whole Fabrick, nor can without great Difficulty be amended: Whence the Architects ought to use their utmost Diligence; because in some Places they have a Natural Foundation, and in other Places 'tis necessary to use Art.

A Natural Foundation, is, when we build on Stone, a soft, sandy, or mouldring Stone or Gravel; for these, without digging, or other helps of Art, are of themselves excellent Foundations, and most fit to uphold the greatest Buildings, both in Land, and in Water. But if Nature affords not a Foundation, it must be attempted by Art; and then the Place you have to build on is either a solid Earth, or a gravelly, sandy, mossy, soft and moorish Place. If the Earth be fast and firm, you may dig so far as to a discreet Architect may seem requisite for the Quality of the Building, and Soundness of the Earth; and (when you intend not to make Cellars, or other Under-ground Offices) your Depth is to be a sixth part of the Height of the Building. To know this Firmness, Observation from the digging of Wells, Cisterns, and such-like, will help well; and 'tis also known by Herbs growing there, if they usually spring up only in firm and fast Grounds; and besides, 'tis a sign of firm Ground, if a great Weight thrown thereon, it neither sounds nor shakes; and from the Report of Drums being set on the Ground, and lightly touched, it does not resound again; and if Water put into a Vessel, doth not shake: The neighbouring Places will also give you to understand the Fastness

Fastness and Firmness of the Earth. But if the Place be Sandy or Gravelly, observe whether it be on Land, or in Water: For if it be on Land, you must take notice what hath been before directed concerning Fast Ground; and if you build in a River, the Sand and Gravel is altogether useless; because the Water, with its continual Stream and Flood, often changes its Bed; therefore dig 'till you come to a Bottom sound and firm; or if that be difficult, dig somewhat in the Sand and Gravel, and then place Piles, whose Ends may reach to the sound and good Earth, and upon those you are to Build: But if you are to Build upon a Mossy and Loose Ground, then you must dig 'till you find Sound Earth, and therein also so much as the Bigness of the Walls and the Greatness of the Building require.

This Sound Ground (and fit to uphold Buildings) is of divers sorts; for (as *Alberti* well saith) Somewhere so Hard, as *'tis scarce to be cut with Iron*, somewhere very Stiff, somewhere Blackish, somewhere Whitish (which is accounted the weakest,) somewhere like Chalk, somewhere Sandy; of all these, the best is that which is cut with most Labour, and when wet, doth not dissolve into Dirt.

You should not Build upon a Ruin, or Old Foundation, if first of all you know not its Depth, and whether it be sufficient to bear the Building: But if the Earth be Soft, and Sink much, as in Moorish Grounds, then you must place Piles, whose length must be an Eighth part of the height of the Wall, and in thickness a Twelfth part of their length: The Piles must be placed as close as one can stand by the other, and are to be rammed in with Blows rather quick than heavy, so that the Earth may the better consolidate and fasten. You must place the Piles, not only under the Out-Walls, upon the Trench or Gutters, but also under the Inner-Walls which divide the Building: For if you make the Foundation for the Inner-Walls different from those Without, then laying Beams along one by the other, and others athwart them above, often-times it happens that the Inner-Walls fall down; when those Without, being placed on Piles, stir not; whence all Walls come to cleave, the which render the Building ruinous, and is very uncomely to look on; wherefore you must avoid this Danger. making the Piling Work

of less Charge; for, according to Proportion of Walls, the Piles in the Middle may be placed thinner than those Without.

CHAP. VIII.

Of Foundations.

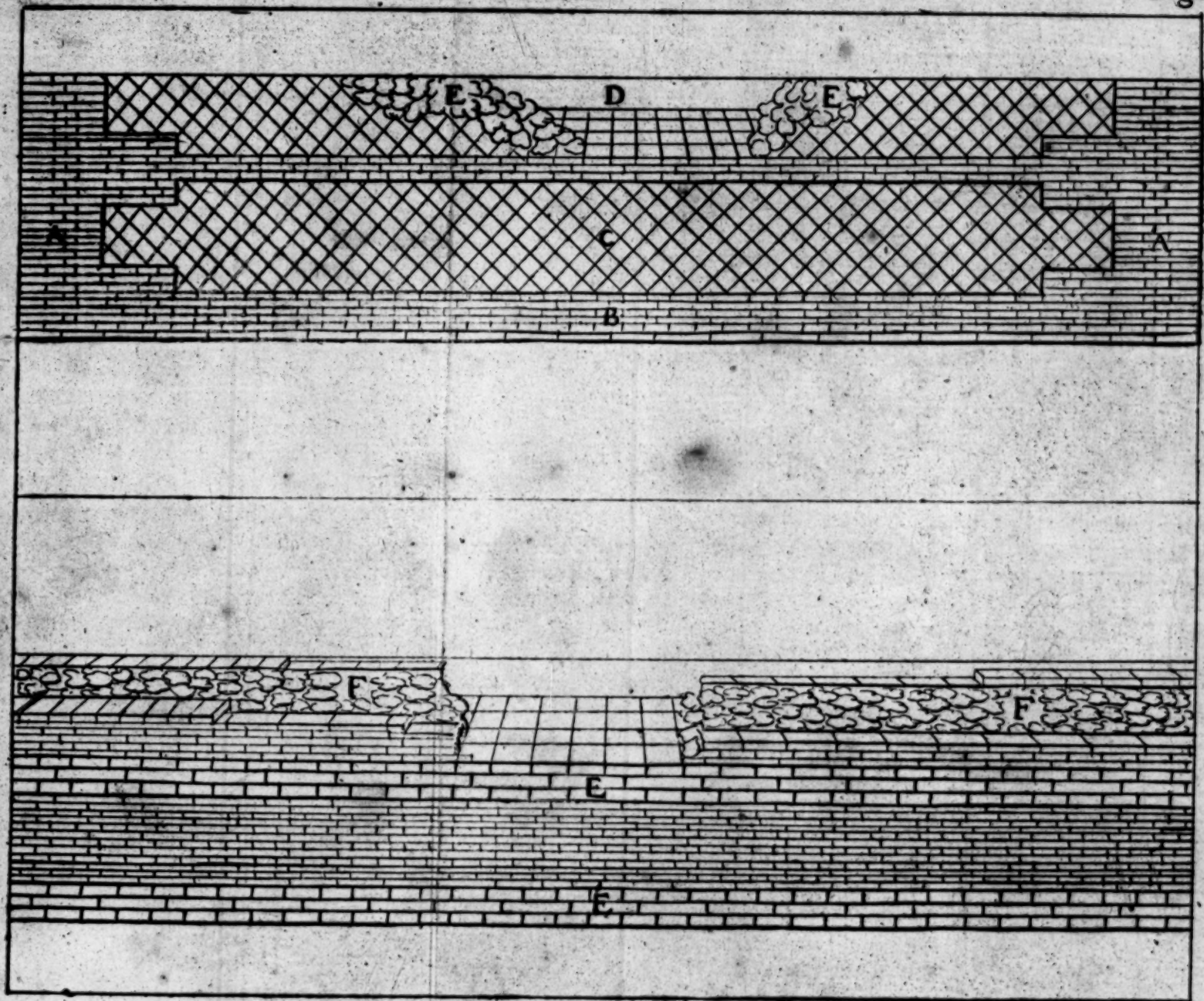
Foundations ought to be twice so thick as the Walls to be raised thereon; and therein the Quality of the Earth, and the Greatness of the Building, is to be regarded, making them more large in soft and looser Ground, and where there is a great Weight to be sustained. *The Plain of the Trench* must be Level, so that the Weight may press equally; and not inclining to one part more than another, may prevent the cleaving of the Walls. For this reason, the Antients used to pave the Plain with **Tivertine*; and we lay Planks and Beams, and build thereon.

* *Tivertine*,
a certain Stone
brought from
Tivoli.

Foundations are made Sloping, that is to say, to Diminish as they rise; yet so, as that there may be so much left on one side as on the other, so that the middle of that above may fall perpendicularly upon the middle of the lower Work; which must be also observ'd in the Diminution of Walls above Ground; because by this means the Building becomes much stronger, than by making the Diminutions any other Way.

There is sometimes made, (especially in Moorish Grounds, where there is need of Piles) to avoid Charge, Foundations discontinued, but with certain Vaults, upon which they afterwards Build. In great Buildings 'tis very commendable to make Vents through the Body of the Walls, from the Foundation to the Roof, because they let forth the Wind, (which is very prejudicial to Buildings) lessen the Charge, and are of no small Convenience, if in them you make Winding-Stairs from the Bottom to the Top.





C H A P. IX.

Of the Fashion of Walls.

THE Foundations being laid, it remains that we treat of the Superstructure. The Antients had Six sorts of Walls: one call'd *Reticolata*, or *Net-work*; another of *Quadrels*, or *Brick*; a third of *Cement*, which is of rough Stones from the Hills or Rivers; a fourth of various Stones; a fifth of squared Stones; the sixth *Riempista*, which is also called *Coffer-work*. Of the *Net-work* there is no use at all in these Days; but because *Vitruvius* relates it was common in his Time, I do here put also that Design. They made the Coignes, and Corners of their Building of *Quadrels*, and every two Foot and half took up three Courses of *Quadrels*, which bound the whole Thickness of the Wall.

- A Coignes, or Corners of *Quadrels*.
- B Courses of *Quadrels*, which bind the whole Wall.
- C The *Net-work*.
- D The Courses of *Quadrels* through the Thickness of the Wall.
- E The Inner part of the Wall made of *Cement*.

Walls of *Brick*, or *Quadrels*, both those about Cities, and other great Edifices, must be so made, that the inside and outside may be of *Quadrels*, and in the middle filled up with *Cement*, and with *Brick*, *Earth* and *Stone*, ramm'd together; and to every three Foot in Height there must be three Courses of *Quadrels* of the biggest sort, which may take the whole Breadth of the Wall. And the first Course must be laid with the length inward, that the lesser part of the *Brick* be exposed; the second the length laid sidewise; and the third as the first: Of this sort are the Walls of the *Rotunda* in *Rome*, and the Baths of *Dioclesian*, and all other ancient Buildings which are there.

E The

- E The Courses of *Quadrels*, which bind the whole Wall.
 F The middle part of the Wall made of *Cement*, between one Course and the other, and the outward *Quadrels*.

The Walls of *Cement* must be made so, that to every two Foot at least there be three Courses of *Quadrels* or *Brick*, and that the *Quadrels* or *Brick* be prepared according to the manner aforesaid. Such are the Walls of *Turin* in *Piedmont*, which are made of *River-Pebbles* split in the middle, which being placed with the split side outwards, make very even and smooth work. The Walls of the *Arena* of *Verona* are likewise of *Cement*, and there are three Courses of *Quadrels* to every three Foot: And in like manner are made other ancient Edifices, (as appears in my Books of *Antiquities*.)

- G *Cement* or *River-Pebbles*.
 H Courses of *Quadrels* which bind the whole Wall.

The Walls of *Irregular Stones*, were so called, because they were made of Stones of unequal Sides and Angles; and to make these Walls, they used a *Plumb-Rule*, which applied to the Place where the Stone was to be put, served to place them straight and even, thereby to try, time after time, if the Stone stood right in the designed Place. Of this sort may be seen Walls at *Pre-neste*, and ancient Streets were paved in this Manner.

- I *Irregular Stones*.



4



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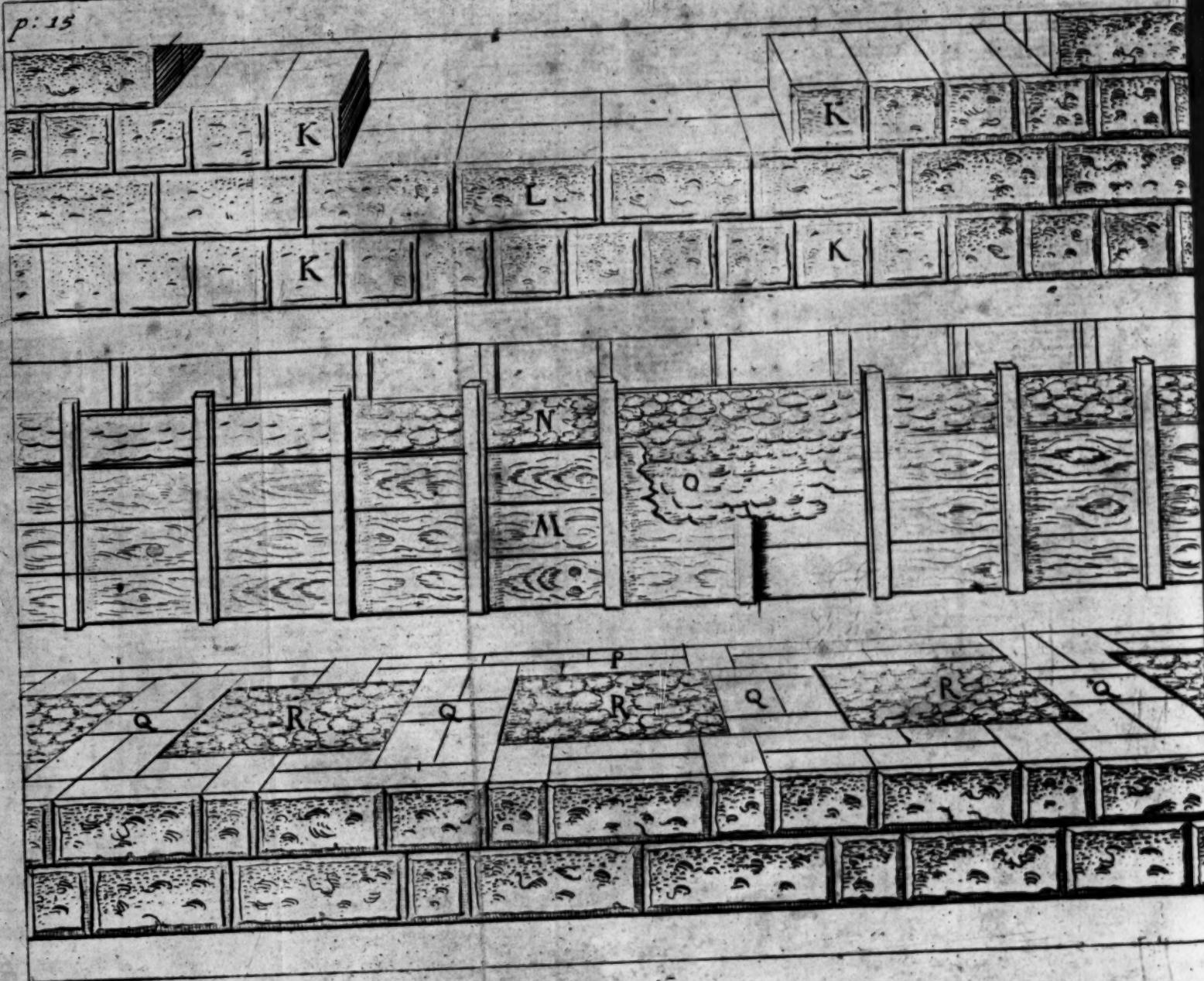
all other ancient buildings which are there.

At

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p. 15



At Rome may be seen Walls of squared Stones, where was the Piazza and the Temple of *Augustus*, in which they locked in the lesser Stones with Courses of greater.

K Courses of lesser Stones.

L Courses of bigger Stones.

The Manner of *Riempiuta*, or Filled Walls, which is also called *Coffer-work*, which the Antients did use; taking Planks and placing them edgewise, allowing so much Space as they would have the Thickness of the Wall, filling it with Morter and Stones of all sorts mingled together; and so they went on from Course to Course. There is seen such-like Walls at *Sermion* upon the Lake de *Grada*.

M Planks put Edgewise.

N The Inner part of the Wall.

O The Face of the Wall, the Planks taken away.

Of this kind may be call'd the ancient Walls of *Naples*, which had two Walls of squared Stones four Foot thick, and six Foot distant the one from the other: Those Walls were bound together with other Cross-Walls; and the *Cases* which were between the Traverse-Walls and the Out-Walls were four Foot square, and were fill'd up with Stones and Earth.

P The Outward Stone-Wall.

Q The Traverse Walls.

R Cases filled with Stones and Earth.

These were the Forms of which the Antients did serve themselves; and the Footsteps thereof are still to be seen: Whence it may be concluded, that Walls, of what sort soever, ought to have some Tires, or Courses, which are like Sinews that hold fast

fast all other Parts together, which chiefly may be observed when Walls are made of Brick : For the Structure, through Age, falling asunder in the middle, the Walls may not become ruinous ; as hath happen'd and is seen in many Walls, especially on that side which respects the North.

CHAP. X.

Of the Method which the Antients did practise, in making their Stone Buildings.

BECAUSE it happens that sometimes Buildings are made (the whole, or good part) of Marble, or some other great Stones, I think it convenient, in this Place, to acquaint you what the Antients did in such Cases : For we may observe in their Work, that they were so diligent in joining their Stones together, that in many Places their Connexion can scarcely be perceived. And besides, the Beauty, Firmness, and Duration of the Fabrick is very much to be regarded.

And, forasmuch as I can understand, they first squared and wrought the Sides of the Stones which were to be placed one upon the other, leaving the other Sides rough, and so used them, whereupon the Edges of the Stones were beyond the Square ; and might manage them better, and more variously attempt to place them right, without danger of breaking, than if they had been squared on all Sides before : For when the Edges are made square, or less than square, they are very weak, and subject to Accidents. In this manner they made all Buildings rough, or, as one may say, rustick ; and that being done, they go on working and polishing the Face of the Stone which is to be seen. It is true, that the Roses which are between the Modillions, and other such-like Ornaments of the Cornice, could not commodiously be done when the Stones are fixed ; therefore they made them while they

they were on the Ground. This is well attested by many ancient Buildings, where may be seen many Stones rough and unpolished. The Arch by the old Castle in *Verona*, and all other the Arches and Buildings there, were done in the same manner; which is easily made out, by One curious in observing the Marks of their Tools, that is to say, the Manner how the Stones were Wrought: The Pillars of *Trajan* and *Antonine* in *Rome* were so made; nor could they otherwise have so exactly joined the Stones that might so closely meet where they go cross the Heads, and other Parts of the Figures. And the same may be said of the other Arches which are there.

And if the Works were very great, as the *Arena* of *Verona*, the Amphitheatre of *Pola*, and the like, to save Charge and Time, which they would have required, they wrought only the Imposts of the Arches, Capitols, and the Cornices, and the rest they left Rustick, having only regard to the fair Front of the Building. But in Temples and other Buildings which required Curiosity, they spared no Pains in the working them, and glazing and smoothing ev'n the very Fluces of the Columns, and polishing them diligently. Therefore, in my judgment, you should not make Walls of Brick in the Rustick Manner, much less Mantles of Chimneys, which require curious Work; for besides the Unhandsomness, 'twill happen that they will split and divide asunder, which naturally ought to be entire; but according to the Greatness and Quality of the Building, you may make them Rustick or Polite: And in a Work that requires altogether Neatness, we need not do as the Antients used, and that with very good Reason, being necessitated by the Greatness of their Works.

C H A P. XI.

*Of the Diminution of Walls, and of
their Parts.*

IT is to be Observed, That by how much Higher the Walls are, so much the Narrower they must be ; therefore that part which is above Ground is to be one half Thinner than the Foundation, and the Second Story a half Brick Thinner than the First, and so continue 'till you come to the Top of the Building, but with Discretion, that it be not too Weak. The Middle of the Upper Wall ought to fall direct to the Middle of the Lower, that so all the Walls be in a Pyramidal Form. But if you would make a Superficies or Face of a Wall above, directly over that below, it must be on the Inner part ; because the Raftings of the Floors, the Vaults, and other Supporters of the Building may not suffer the Wall to fall, or give way. The Discharged part which is on the Outside must be supplied with a Border or Cornice encompassing the whole Building, which will be an Ornament and Fastning to the whole Fabrick.

The Angles, because they partake of both Sides, and are to keep them upright and fast together, must be very strong, and held with long and hard Stones, as it were with Arms ; therefore the Windows and Apertures must be as far from them as may be ; or at least, so much Space must be left between the Aperture and the Angle, as is the breadth of the Aperture.

Having spoken of meer Walls, 'tis convenient to pass to the Ornaments, the greatest whereof are the Columns, when they are meetly placed, and have fair Proportion to the whole Fabrick.

C H A P. XII.

Of the Five Orders used by the Antients.

Five were the Orders among the Antients, that is to say, the *Tuscan*, *Dorick*, *Ionick*, *Corinthian*, and *Composita*, which ought to be so disposed in the Building, that the strongest be set lowest; for then 'twill be more capable to bear the Weight, and the Building will have a more sure Foundation: wherefore they always place the *Dorick* under the *Ionick*, the *Ionick* under the *Corinthian*, and the *Corinthian* under the *Composita*: The *Tuscan*, as being rude, seldom is used above Ground, unless in a Building of one Order only, as in Town-houses, or in vast Buildings, as Amphitheatres, and such-like, where being many Orders, this, instead of the *Dorick*, is placed under the *Ionick*, and if you leave out one of them, and place, for example, the *Corinthian* immediately over the *Dorick*, which may be done according to the Rule aforesaid, provided always that the more solid be the lowest, I shall set down particularly the Measure of each of these Orders; not so much according to the Doctrine of *Vitruvius*, as according to my own Observations in Ancient Buildings: But first I will say those Things which belong to all in general.

C H A P. XIII.

Of the Swelling of Columns, and their Diminutions: Of Inter-Columns and Pilasters.

Columns of every Order must be so formed, that the upper part must be lesser than the lower, and the middle somewhat thick: In Diminishing, it must be observed, that by

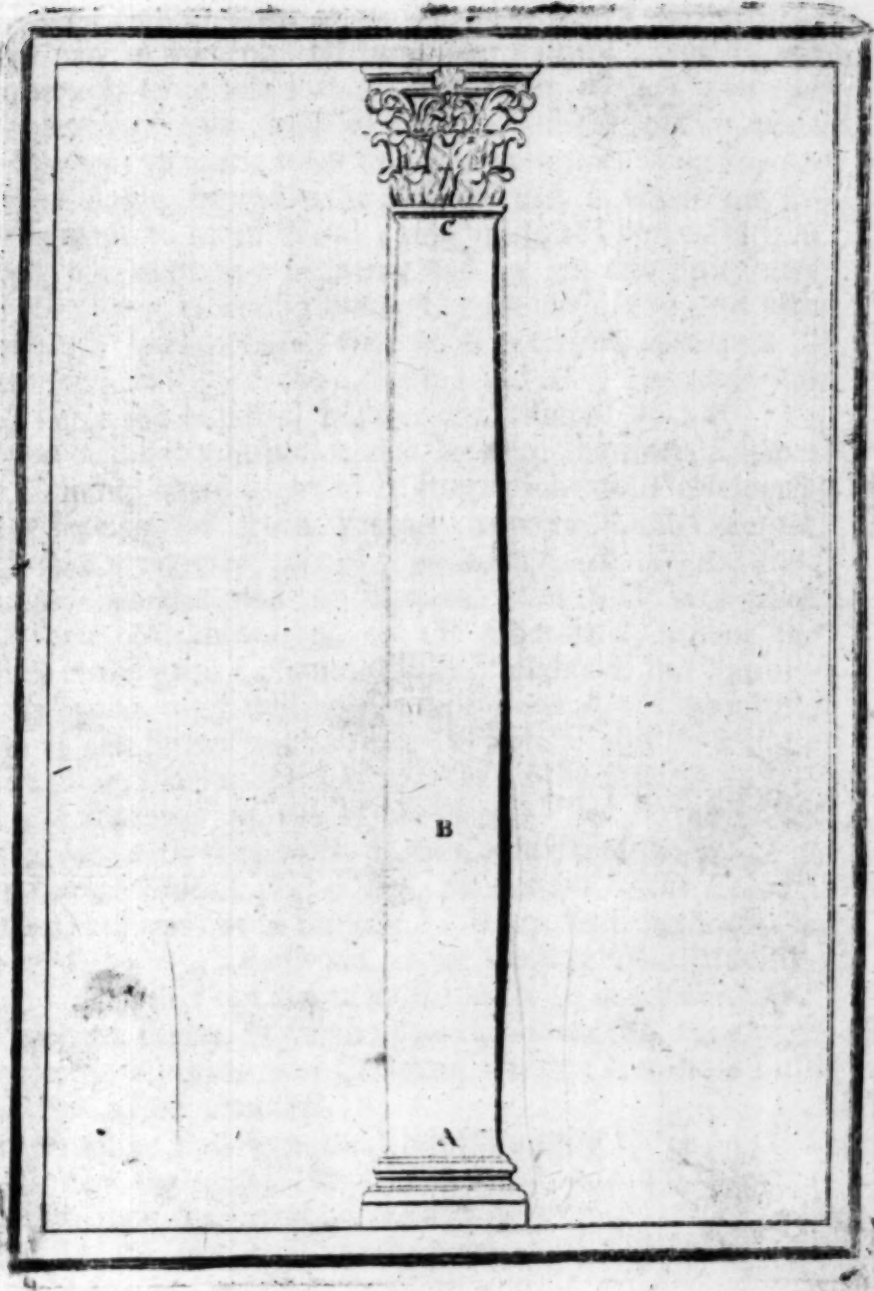
how much longer the Columns are, so much the less must they be diminished, in regard that the Height of it self works the Effect of Diminishing by the Distance; therefore if the Column be 15 Foot high, the Diameter of the Column below must be divided into $6\frac{1}{2}$ Parts, and the Diameter thereof above shall be $5\frac{1}{2}$ of those Parts. If from 15 to 20, the Diameter below must be divided into seven Parts, and six $\frac{1}{2}$ must be the Thickness of the upper Part; so likewise those which are from 20 to 30, the Diameter below must be divided into 8 Parts, and 7 must be the Diameter of the upper Part; and so the Columns which are higher are to be diminished proportionably by their several Parts, (as *Vitruvius* shews in his Second Chapter of his Third Book.) But now the Swelling is to be made in the Middle, we have no more to shew from him than a bare Promise, and therefore many have written variously thereof. I am wont to make the Profile of the said Swelling in this Manner; I divide the Body of the Column into three equal parts, and leave the lower third part perpendicular; at the end of which I lay a long thin Rule as long as the Column, or a little more, and move that part which reacheth from the third part upwards, and bend it 'till the end touch at the Point of the Diminution, at the top of the Column under the *Collarino* or *Astragal*; according to that Bending I proceed, and so the Column becomes somewhat swelled in the middle, and appears very handsome; and although I could not have contrived (besides this) a Form either shorter, or more expedient, or that might be more acceptable, I am yet more confirmed in this my Opinion; since it hath so much pleased *Pr. Cattaneo*, that (I having told him of it) he hath put it into one of his Works of *Architecture*, with which he hath not a little illustrated this Profession.

A B The third part of the Column, which is perpendicular.

B C The two thirds diminished.

C The Point of the Diminution under the *Collarino* or *Astragal*.

The





The Inter-Columns, that is to say, the Spaces between the Columns, may be made of a Diameter and $\frac{1}{2}$ of the Column; and the Diameter is to be taken at the lower part of the Column of two Diameters of two and $\frac{1}{2}$ of three, and sometimes of more. But the Antients were not wont to allow more than three Diameters of the Column, except in the *Tuscan* Order, in which the Architrave is wont to be of Wood; they made the Inter-Columns very large, not less than a Diameter and $\frac{1}{2}$; and this Space they allowed sometimes, especially when they made the Columns very big: but those Inter-Columns were most preferred that were of two Diameters and $\frac{1}{2}$ of the Column; and they accounted this the most noble and beautiful Manner of the Inter-Columns.

And you ought to take notice, that between the Inter-Columns and the Columns there ought to be Proportion and Correspondence; for leaving too much Vacancy between small Columns, you will take away great part of their Beauty, because the great quantity of Air that will be between them will very much diminish their Thickness; and on the other hand, leaving too little Space to the great Columns, by the Streightness and Narrowness of the Spaces, they will appear Gouty and very Ungraceful: Therefore if the Spaces exceed three Diameters, you must make the Columns in Thickness a seventh part of their Height, (as I shall observe hereafter in the *Tuscan* Order;) but if the Spaces shall be 3 Diameters, the Length of the Column must be $7\frac{1}{2}$ or 8, as in the *Dorick* Order; and if $2\frac{1}{2}$, the Length of the Column must be 9 Diameters, as in the *Ionick*; if 2, the Length of the Column must be $9\frac{1}{2}$ Diameters, as in the *Corinthian*: lastly, if $1\frac{1}{2}$, the Length of the Column must be 10, as in the *Composita*. Concerning these Orders, I have taken this Care, that they may be Examples for all other Inter-Columns, (which *Vitruvius* intimates in the Chapter aforesaid.)

In the Front of Buildings the Columns ought to be an even number, so that the middle Inter-Columns may be made bigger than the rest, that the Doors and Entries may be the better seen, which usually are placed in the middle. And thus much for Pillar-work only.

But if Galleries be made with Pilasters, they must be so disposed, that the Pilasters be not less than a third of the Vacancy between

between Pilaster and Pilaster ; and those at the Corners must be two thirds bigger than the other, that so the Angles of the Fabrick may be firm and strong ; and when they are to support an extraordinary great Weight, as in very great Buildings, then they must be the half of the Vacancy, as those of the Theatre of *Vicenza*, and the Amphitheatre at *Capua* ; or else two thirds, as those of the Theatre of *Marcellus* in *Rome* ; and of the Theatre of *Ogubas*, which now belongs to Signior *Lodovico de Gabrielli* a Gentleman of that City. The Antients also made them sometimes as large as the whole Vacant, as in the Theatre of *Verona*, in that part which is not upon the Hill. But in private Buildings they are not to be made less than a third of the Vacant, nor larger than two thirds ; and they ought to be Square ; but to save Charge and to make Room to walk more freely, they may be made less in the Flank than in the Front.

And to adorn the Frontispiece, you may put in the middle of the Front half Columns, or other Pilasters, which may bear up the Cornice which shall be upon the Arches of the Gallery ; and they must be as large as their height shall require, according to their several Orders ; as in the ensuing Chapters and Designs may appear : For the understanding whereof, (that I may not repeat the same thing often) you may observe, that I, in the dividing and measuring the said Orders, would not take a certain and determinate Measure which is peculiar to any City, as Cubit, Foot, or Span, well knowing that Measures are as various as the Cities and Countries : But, in Imitation of *Vitruvius*, who divides the *Dorick* Order with a Measure taken from the Thickness of the Column, which is common to all, and by him call'd a *Module* ; I will also serve my self with such a Measure in all the Orders, and the *Module* shall be the Diameter of the Column, taken at the Base, divided into 60 Parts, except in the *Dorick*, in which the *Module* is to be the Half Diameter of the Column, and is divided into 30 Parts ; for so it falls more commodious in the Compartments of the said Order : Wherefore every one may serve himself (making the *Module* greater or less, according to the Quality of the Fabrick) with the Proportions and Profiles designed, convenient to every Order.

C H A P. XIV.

Of the Tuscan Order.

THE *Tuscan* Order, according to that which *Vitruvius* writes of it, and is so indeed, is the most simple and intire of all the Orders, of Architecture; because it retains the most of Antique way, and wants all those Ornaments which render the others so pleasant and agreeable. This had its Original in *Tuscania* a Place very remarkable in *Italy*, whence the Name is derived.

The Column, with its Base and Capital, ought to be in Length seven Models, and at the Top are diminished a fourth part of their Diameter. Having occasion of a Row of Columns of this Order only, you may make the Inter-Columns very large; because the Architraves may be of Wood, and will be very convenient for Country Use, for the Passage in and out of Carts, and other Country Conveniences; and besides, the Charge will be less: But if you make Gates or Galleries with Arches, you must observe the Measures that I have marked in the Design, in which you may observe the Stones so disposed or joined together, as when the whole Work is of Stone; the which I have also directed in the Designs of the other four Orders.

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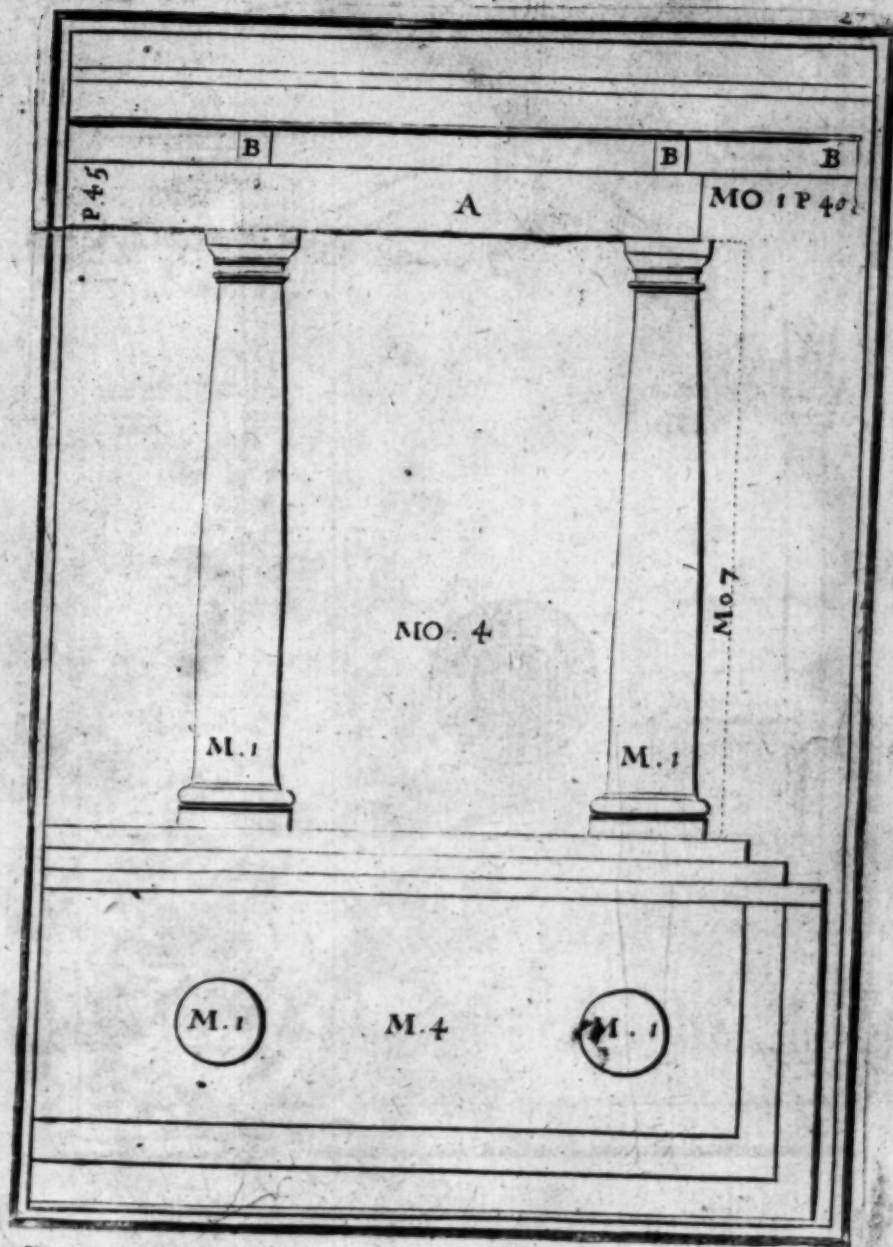
And

And this way of disposing and fastning the Stones, I have derived from many ancient Arches, as appears in my Books of *Arches*; and herein I have used great Dilligence.

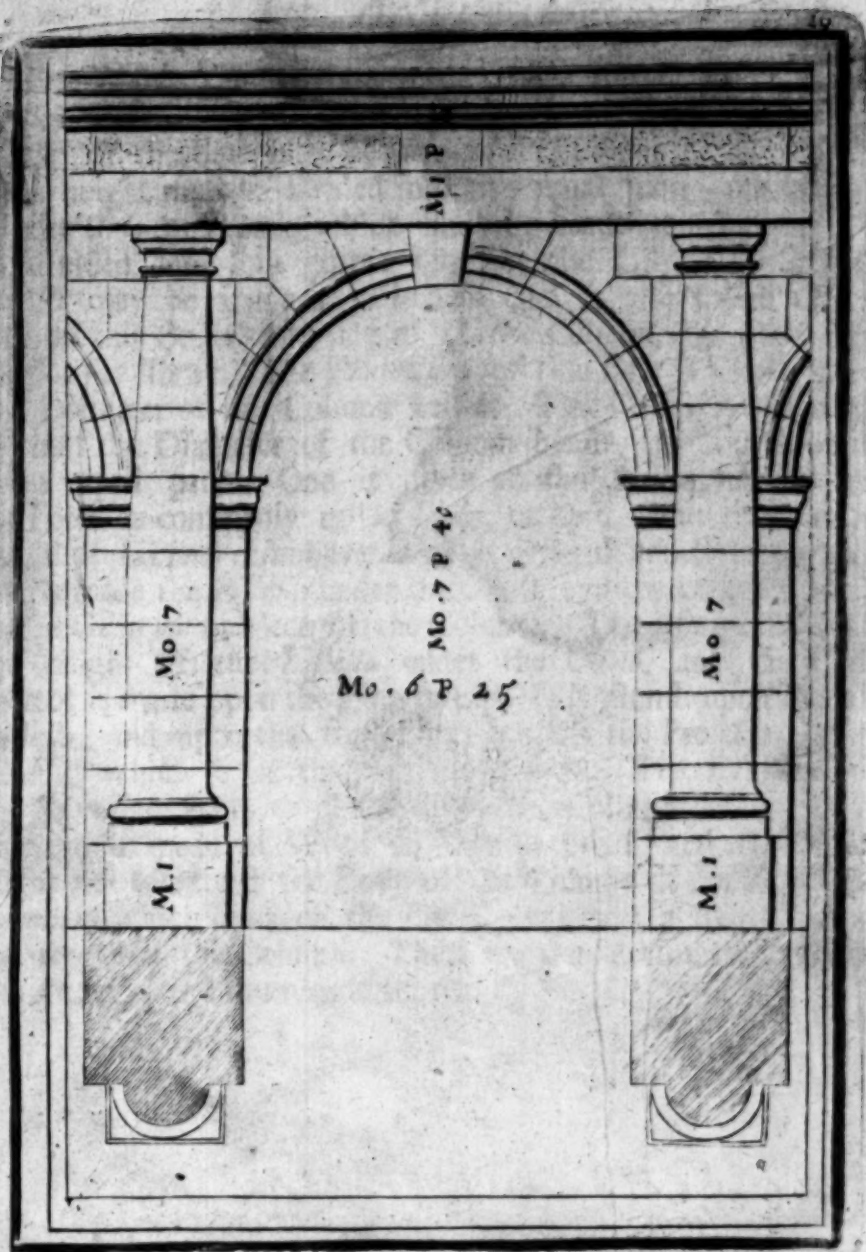
A *Architrave of Wood.*

B *The Ends of the Summers which bear up the Projecture of the Cornice.*

The







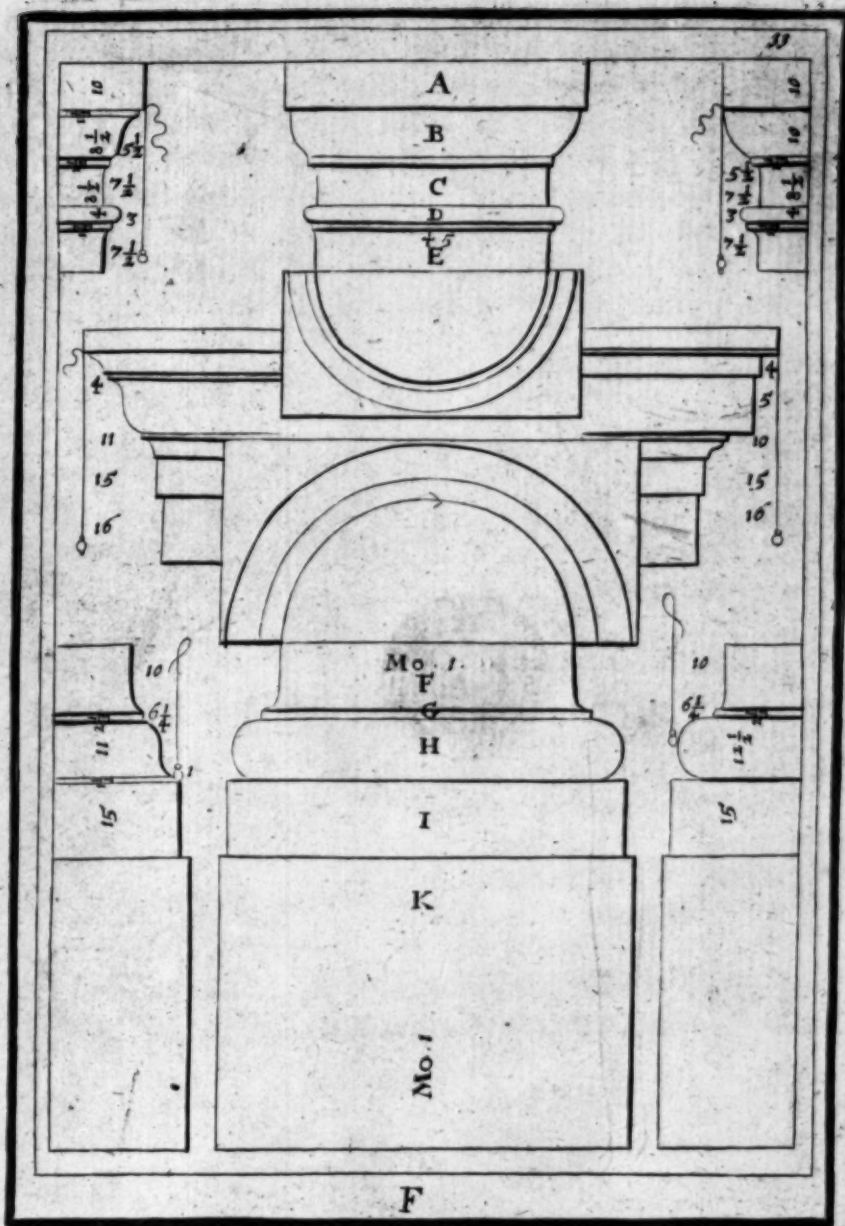


The *Pedestals* which are made under the Columns of this Order, must be the height of one Model, and made plain. The height of the Base is to be the half Diameter of the Column. This height must be divided into two equal parts; one is given to the *Orlo* or *Plinth*, which must be made round; the other is divided into four parts: One for the *Listella* or *Cincture*, which may be made a little less, and is also called *Cimbia*; and in this Order only is part of the Column, the other three are for the *Torus*. The *Projecture* of this Base is a sixth part of the Diameter of the Column below. This *Capitol* is the height of half the Diameter of the Column below, and is divided into three equal parts. One is given to the *Abacus*, which from its Form is commonly called *Dada*, or *Dye*. The other to the *Ovolo* or *Echinus*: And the third is divided into seven parts; of one is made the *Listella* under the *Ovolo*, and the other six remain to the *Collarino* or Neck of the Column. The *Astragal* is double the height of the *Listella* under the *Ovolo*, and the Centre thereof is made upon the Line, which falls plumb upon the said *Listella*; and upon the same Line doth fall the *Projecture* of the *Cimbia*, which is as thick as the *Listella*. The *Projecture* of the *Capitol* answers to the Body of the Column below; its *Architrave* is made of Wood as high as broad, and the breadth ought not to exceed the Body of the Column at the Top. The *Summers* which carry on the *Eaves*, projecteth a fourth part of the length of the Column. These are the Measures of the *Tuscan* Order, (as *Vitruvius* teacheth.)

A *Abacus*.

- A *Abachus.*
- B *Echinus.*
- C *Hypotrachelium, or Frize of the Capital.*
- D *Astragal.*
- E *Body of the Column above.*
- F *Body of the Column below.*
- G *Annulet Cincture, or Listella.*
- H *Torus.*
- I *Orlo or Plinth.*
- K *Pedestal or Stylobatum.*

The Profiles, which are placed by the Plain of the Base and Capital, are the Imposts of the Arches.



34



Of Architecture.

But if they make the Architectures of Stone it will be ob-
 served, what was looked upon of the last Columns; there is
 to be seen some ancient Buildings, which may be said to be built
 according to this Order, because they retain in part the same
 Measures as in the Orders of Doric, and Tuscan of Pops, and
 many others; of which I have undertaken the Profiles, not only
 of the Base of the Capital of the Architectures of the Doric, and
 of the Capital, but down in the last Page of this Chapter, but
 also of the Profiles of Arches, and of all such Buildings
 I shall put the Designs in my Books of Architecture.

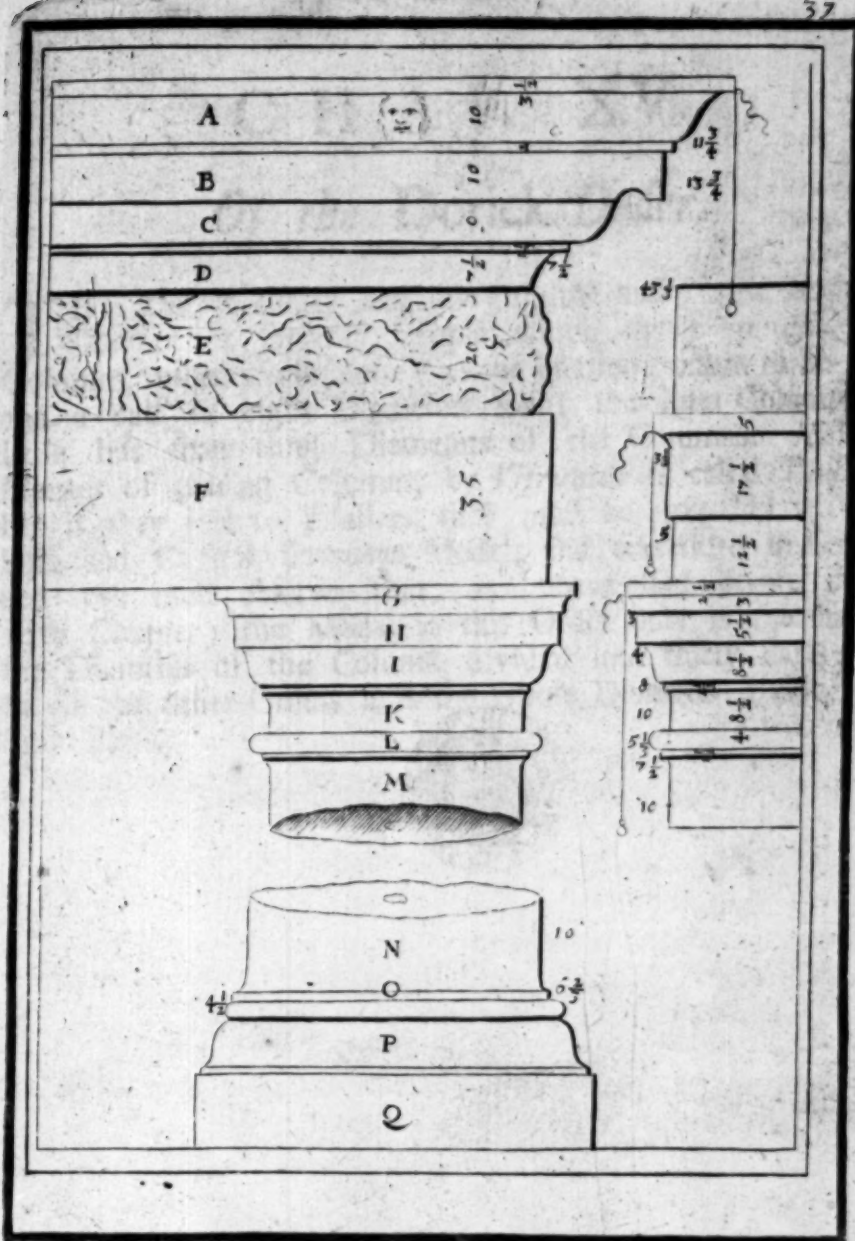
- A. Column of the Doric Order.
- B. Column of the Doric Order.
- C. The Profiles of the Doric and the Doric Order.
- D. Capital of the Doric Order.
- E. Base of the Doric Order.
- F. Architecture of the Doric Order.
- G. Column of the Doric Order.
- H. Column of the Doric Order.
- I. Column of the Doric Order.
- K. Capital of the Doric Order.
- L. Capital of the Doric Order.
- M. Body of the Column under the Capital.
- N. Body of the Column under the Capital.
- O. Capital of the Doric Order.
- P. Capital of the Doric Order.
- Q. Capital of the Doric Order.

Over against the Architecture marked F, is the Profile of Design
 of an Archedue very curiously wrought.

But if they make the Architraves of Stone, it must be observed, what was spoken before of the Inter-Columns; there is to be seen some ancient Buildings, which may be said to be built according to this Order, because they retain, in part, the same Measures as in the *Arena* of *Verona*, and Theatre of *Pola*, and many others; of which I have undertaken the Profiles, not only of the Base of the Capital of the Architrave of the *Frize*, and of the *Cornice*, put down in the last Page of this Chapter, but also those of the Imposts of Arches; and of all these Buildings I shall put the Designs in my Books of *Antiquities*.

- A *Schima Recta.*
- B *Corona.*
- C *The Projecture of the Corona and the Schima Recta.*
- D *Cavetto.*
- E *Frize.*
- F *Architrave.*
- G *Cimatium.*
- H *Abacus.*
- I *Schima Recta.*
- K *Hypotrachelium, or Frize of the Capital.*
- L *Astragalus.*
- M *Body of the Column under the Capital.*
- N *Body of the Column below.*
- O *Annulet, or Cinſure.*
- P *Torus, or Schima Reversa.*
- Q *Orlo, or Plinth of the Base.*

Over-againſt the *Architrave* marked F, is the Profile or Design of an *Architrave* very curiously wrought.





C H A P. XV.

Of the Dorick Order.

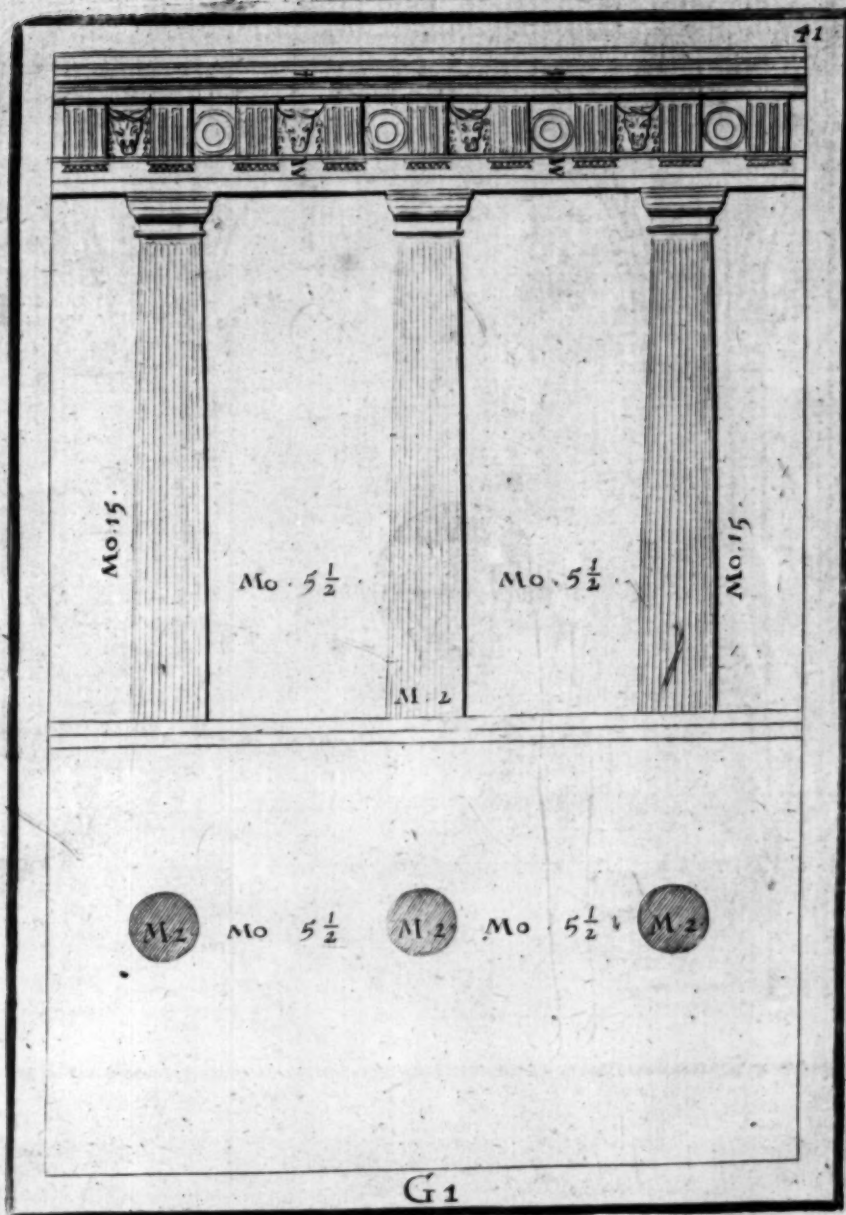
THE Dorick Order had its Original and Name from the Dorians a Grecian People which dwelt in Asia; the Columns, when made alone without Pilasters, ought to be seven and a half, or eight Diameters long; the Inter-Columns are little less than three Diameters of the Columns. And this Manner of placing Columns, by Vitruvius is call'd *Diastylus*; but if they join to Pilasters, they must be, together with the Base and Capital, seventeen Models and one third in Length; and you must observe, that (as I have said before in the 13th Chapter) the Model in this Order only is the half of the Diameter of the Column, divided into thirty Parts; and in all the other Orders it is the whole Diameter divided into sixty Parts.

Amongst

C H A P. XV.

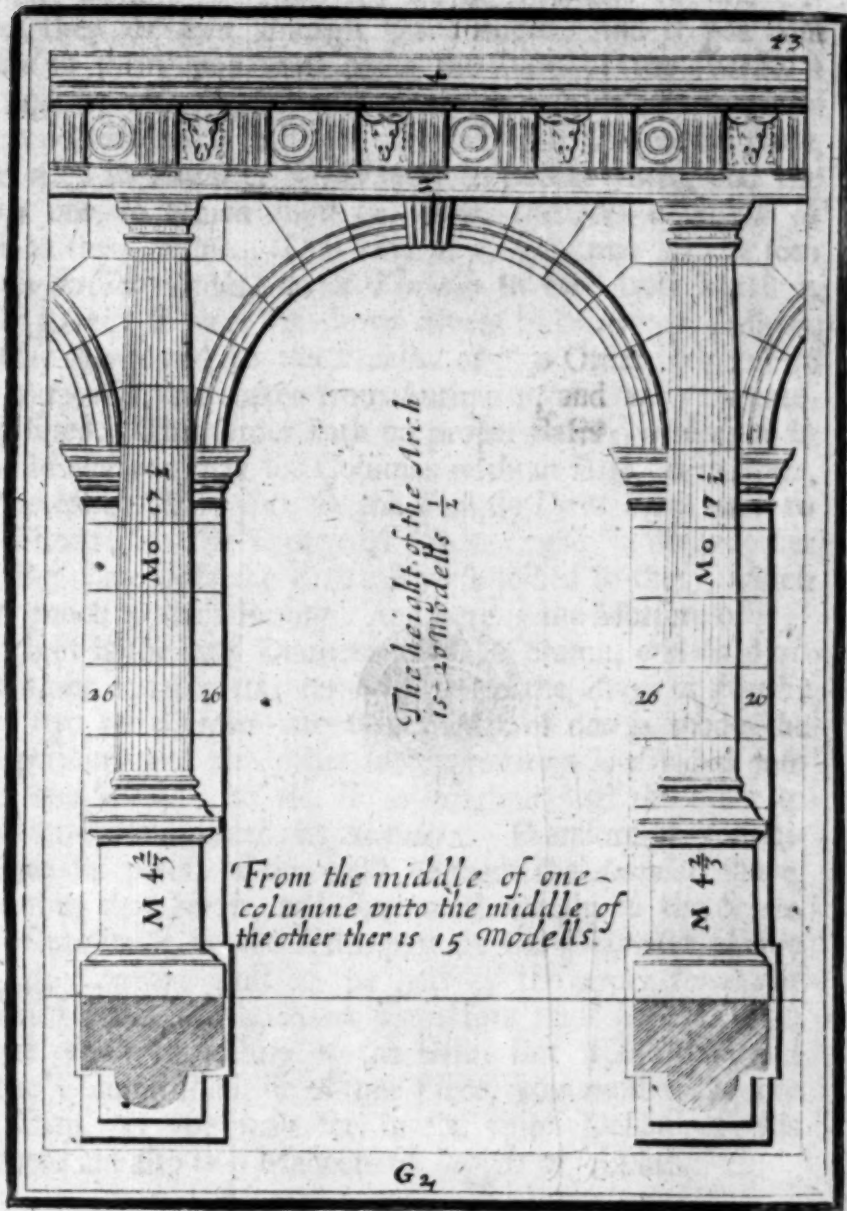
Of the Dorick Order.

THE Dorick Order had its Original and Name from the Dorians a Grecian People which dwelt in Asia; the Columns, when made alone without Pilasters, ought to be seven and a half, or eight Diameters long; the Ionic Columns are little less than three Diameters of the Columns. And this Manner of placing Columns by themselves is called Dorick; but if they join to Pilasters they must be together with the Base and Capital seventeen Models and one third in Length; and you must observe that (as I have said before in the 1st Chapter) the Model in this Order only is the half of the Diameter of the Column, divided into thirty Parts; and in all the other Orders it is the whole Diameter divided into thirty Parts.



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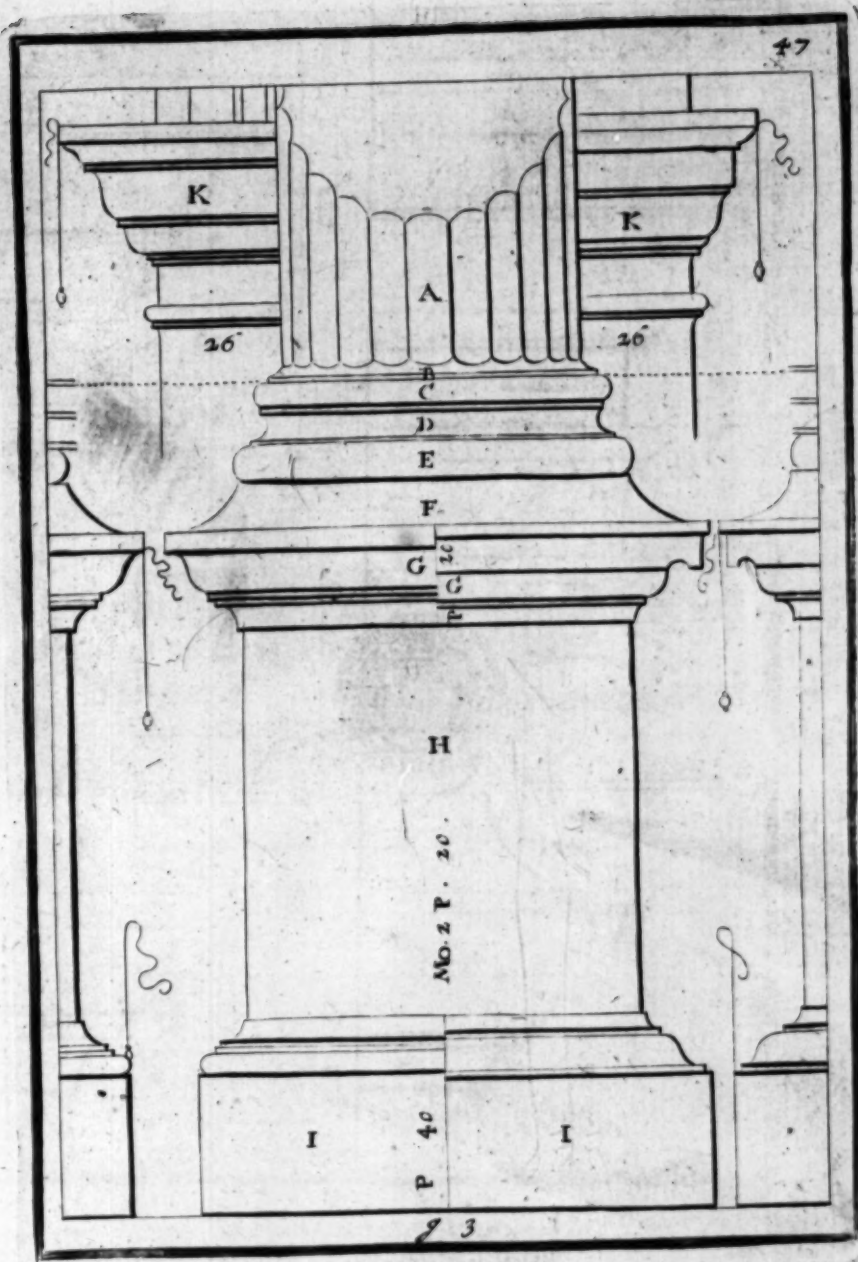






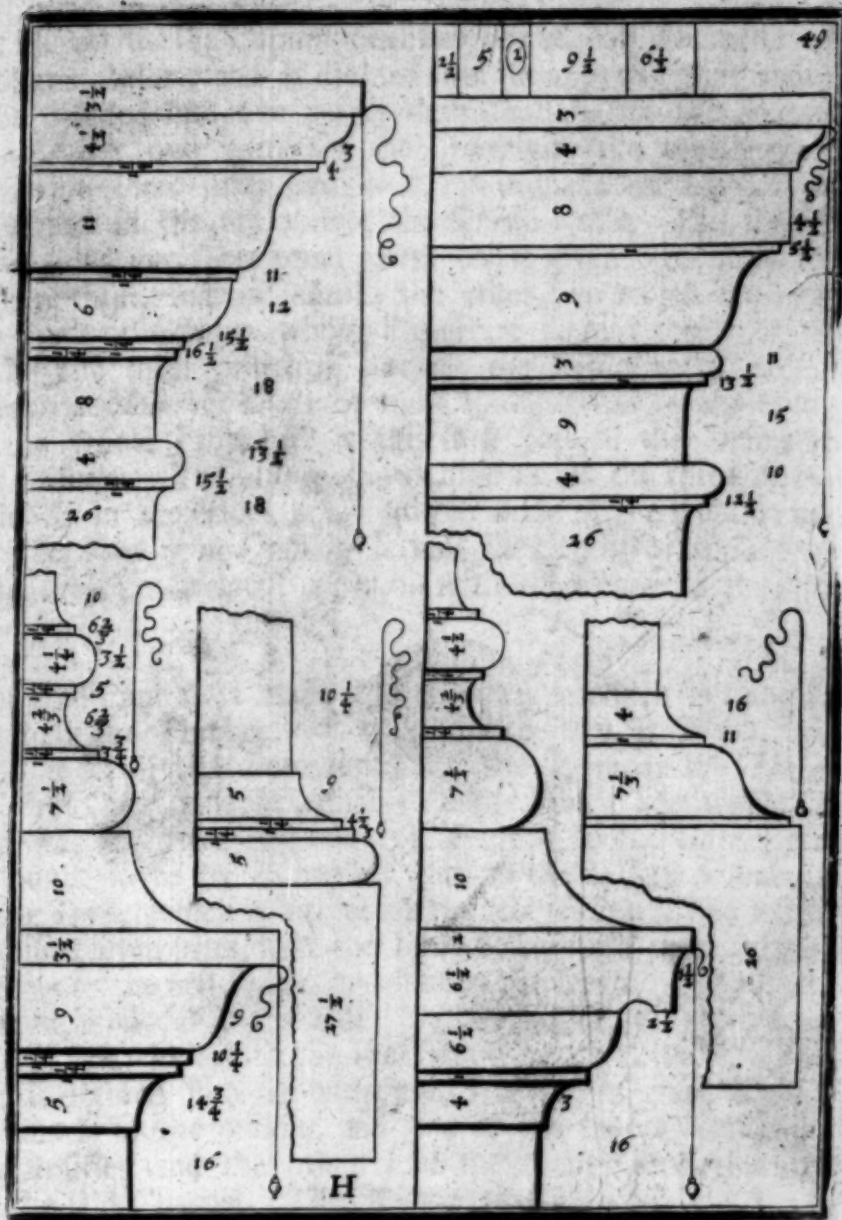
Amongst ancient Buildings we see no *Pedestals* to this Order; yet they are seen amongst the modern: And if you join a *Pedestal* to them, you must make the *Dado* of the *Pedestal* a perfect Square, and from it you must take the Measures of its Ornament; therefore it must be divided into four equal parts, the Base with its *Zocco* or *Plinth* must be two of them, and the *Cymatium* one, to which must be joined the *Orlo* or *Plinth* of the Base of the Column. This kind of *Pedestal* may also be seen in the *Corinthian* Order, as at *Verona*, in the Arch which is called *De Lioni*. I have set down divers Measures of Designs, which may be joined to the *Pedestal* of this Order, which are all very agreeable, and taken from Antiquity, and are very carefully measured. This Order hath no proper Bases; wherefore in many Buildings you may see Columns without Base, as in *Rome*, in the Theatre of *Marcellus*, in the Temple *De la Piera* near to the said Theatre, in the Theatre of *Vicenza*, and in divers other Places. But sometimes the *Attick Base* is joined to them, which adds very much to their Beauty: And here is the Measure of it;

The height is the half Diameter of the Column, and is divided into three equal parts; one is given to the *Zocco* or *Plinth*: the other two are divided into two parts; of one is made the *Torus* superiour, and the other which remains is divided into two, and one is given to the *Torus* inferiour, and the other to the *Scocia* or *Cavetto*, with its *Annulets*. Therefore if you divide it into six parts, of one must be made the *Annulet* above, and the other that below, and four must remain to the *Scocia*. The Projecture must be the sixth part of the Diameter of the Column; the *Cincture* must be the half of the upper *Torus*: If it be divided from the Base, its Projecture must be the third part of the whole Projecture of the Base: But if the Base and part of the Column shall be of one Piece, you must make the *Cincture* small, as you may see in the third Design of this Order, where are also two Manners of *Imposts* of Arches.



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The Height of the Capital ought to be the half Diameter of the Column below, and is divided into three parts; that above shall be divided into five parts; three shall be for the *Abacus*, and the other two parts for the *Cymatium*, the which must be subdivided into three parts; of one is made the *Listella*, or *Annulet*, and of the other two, the *Schima Recta*. The second part is divided into three equal parts; one is given to the *Annulet*, which are three, and are equal; the other two which remains, to the *Ovolo* or *Echinus*, whose Projecture is two thirds of its Height. The third principal part of the said Capital is for the *Hypotrachelium* or *Frize* of the Capital, given to the *Collarino*; the whole Projecture is the fifth part of the Diameter of the Column. The *Astragal* is as high as all the three *Annulets*, and is in Projecture equal to the Body of the Column below. The *Annulet* or *Cincture* is half the Height of the *Astragal*; the Projecture thereof is plumb with the Centre of the said *Astragal*.

Upon the Capital is made the *Architrave*, which is to be in Height half the Thickness of the Column, that is to say, one Model; it is divided into seven; of one is made the *Tenia*, whose Projecture must be equal to its Height. The whole is divided into six parts, one whereof is given to the *Gutta*, the which ought to be six in number, and to the *Listella* which is under the *Tenia*, which is a third of the said *Gutta*. The rest is divided into seven parts, from the *Tenia* downwards, three whereof is given to the first *Fascia*, and four to the second. The *Frize* is in height a Model and a half; the breadth of the *Triglyph* is one Model, and its Capital is the sixth part of a Model. The *Triglyph* is divided into six parts, two whereof is given to the two Channels in the middle, and one to the half Channels at the Extremities, and the other three make the Spaces that are below the said Channel. The *Metopa*, that is to say, the Space between two *Triglyphs*, ought to be as broad as high.

The *Cornice* ought to be in height one Model and a sixth part, and is divided into five parts and a half; two whereof is given to the *Cavetto* and *Ovolo*; the *Cavetto* is less than the

the *Ovolo*, as much as is the *Listella*; the other three and half is given to the *Corona*, and for the *Schima Reversa*, and *Schima Recta*.

The *Corona* ought to have in Projecture four-six parts of the Model; and on its Plain, which looketh downwards, and projecteth forth, must have in length six *Guttae*, and three in breadth, over the *Triglyphs* with their Lists, and over the *Metopa* certain Roses.

The *Guttae* or Bells, answer to those which are under the *Tenia*, which are made in Form like a Bell.

The *Cymatium* must be an eighth part thicker than the *Corona*, and is divided into eight parts, two whereof is given to the *Orlo* or *Listella*, and six remain to the *Cymatia*, whose Projecture is seven parts and a half; whereupon the *Architrave*, the *Frize*, and the *Cornice* fall out to be in height the fourth part of the length of the Column: And these are the Measures of the *Cornice*, according to *Vitruvius*, from whom I have a little swerved, altering the Members, and making them a little bigger.

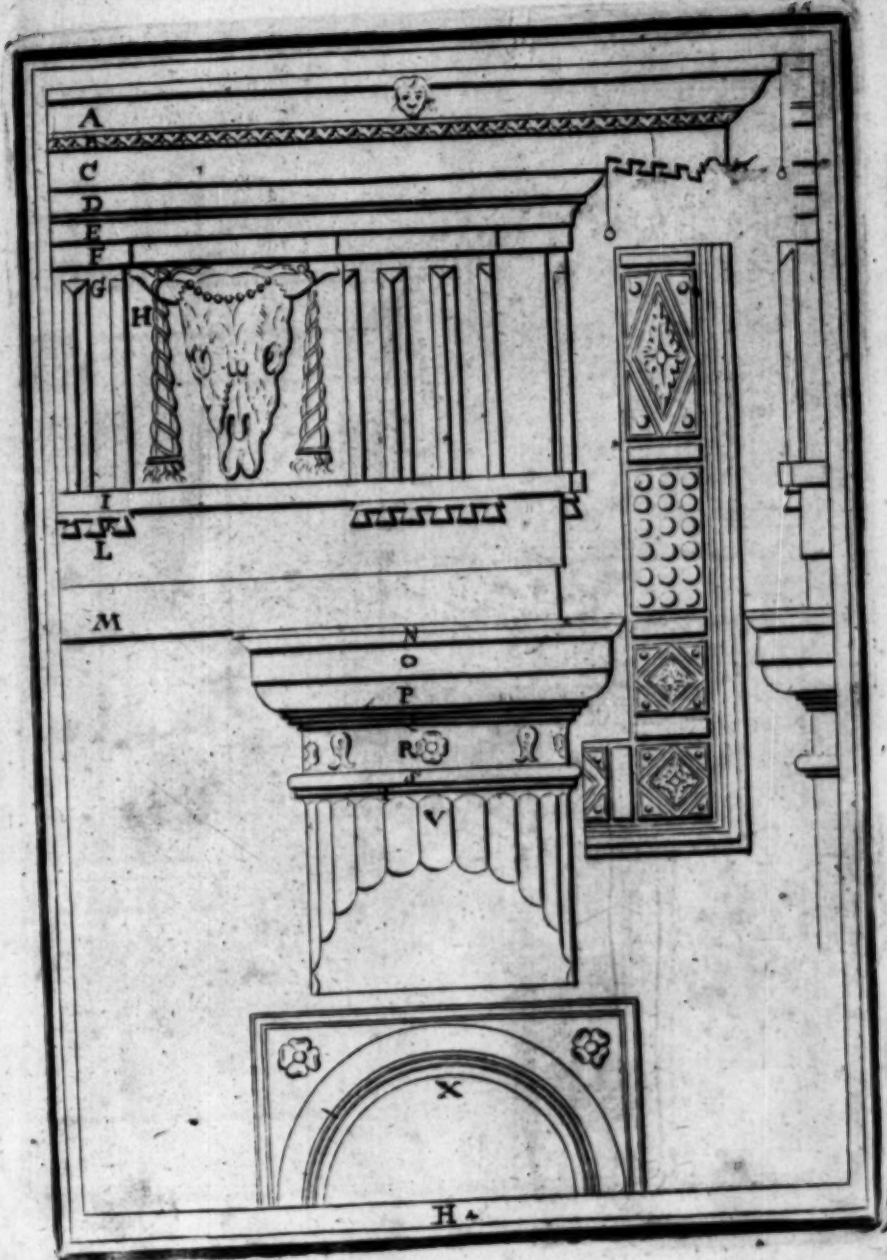
A *Schima*.

OF ACHILLES

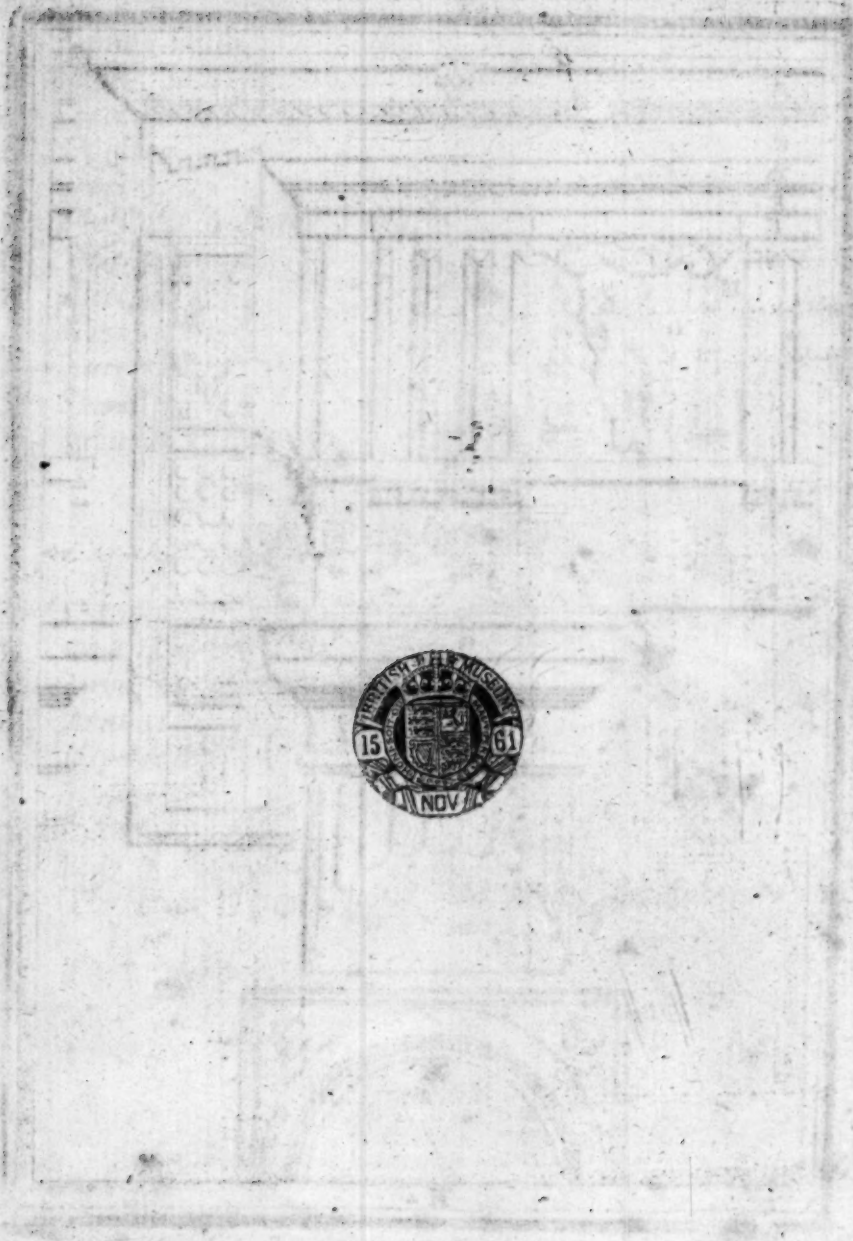
- A Schima Recta.
- B Schima Reversa.
- C Corona.
- D Ovolo.
- E Cavetto.
- F The Capitals of the Triglyph.
- G Triglyph.
- H Metopa.
- I Tenia.
- K Gutta.
- L Prima Fascia.
- M Secunda Fascia.

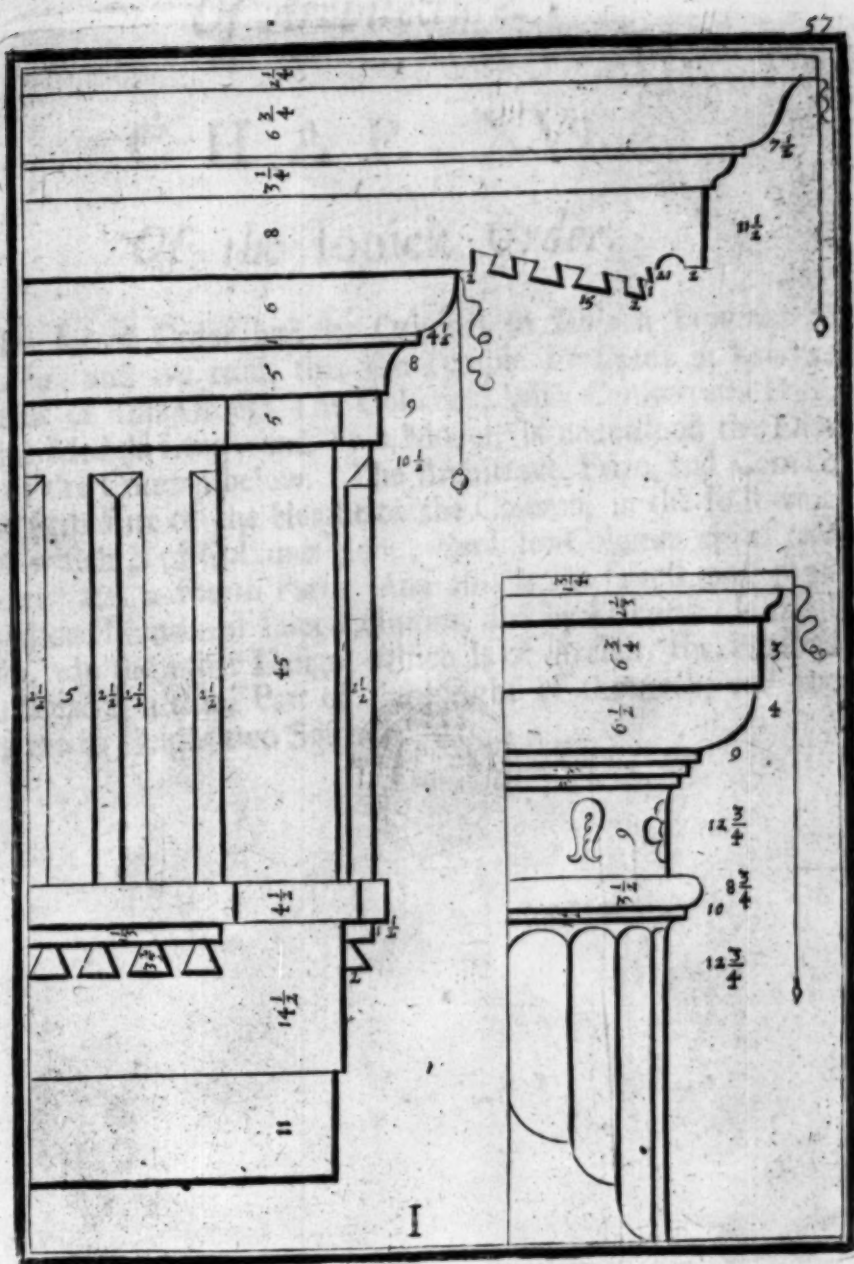
Parts of the Capital.

- N Cymatium.
- O Abacus.
- P Ovolo, or Echinus.
- Q Annulets.
- R Hypotrachelium, or Frize.
- S Astragal.
- T Listella, or Cincture.
- V Body of the Column.
- X The Plain of the Capital, and Model, divided into thirty Parts.
- Y The Under-part of the Corona.

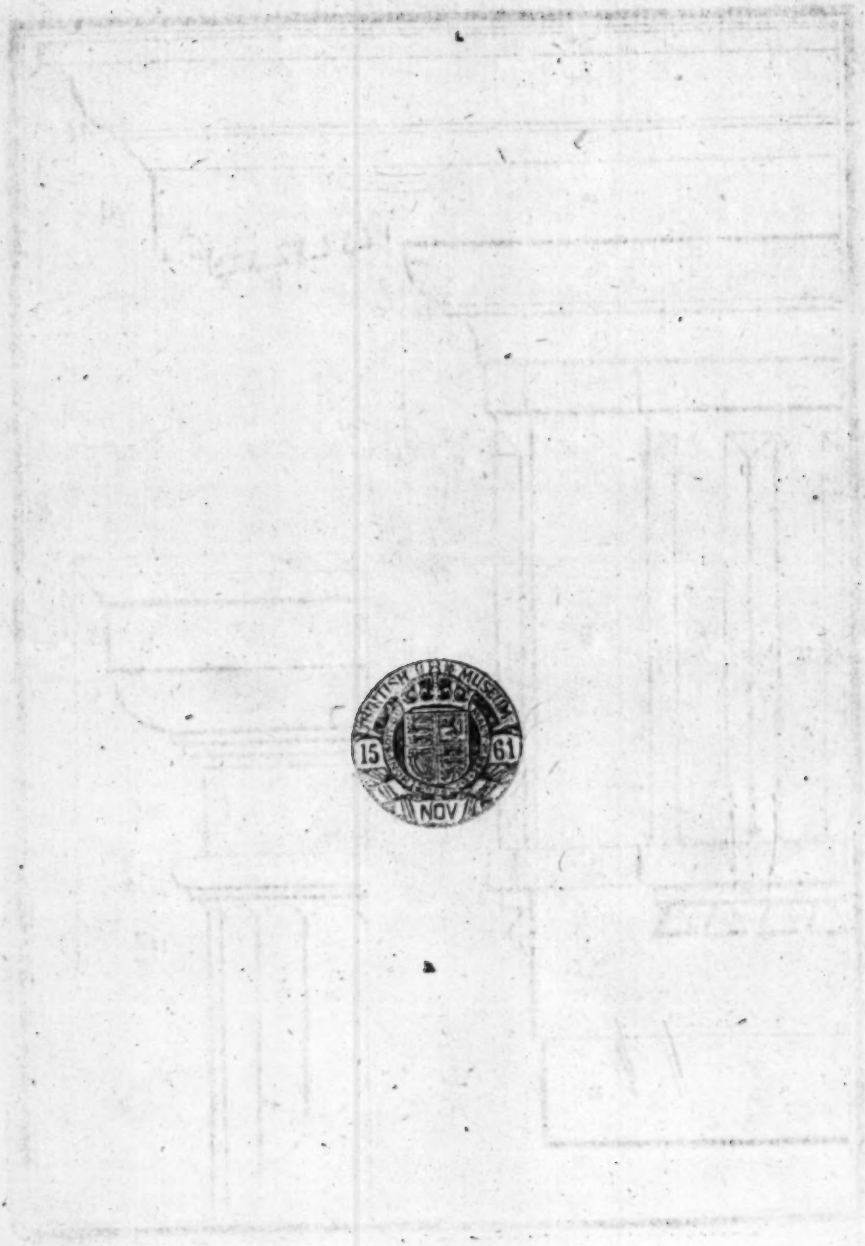


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C H A P. XVI.

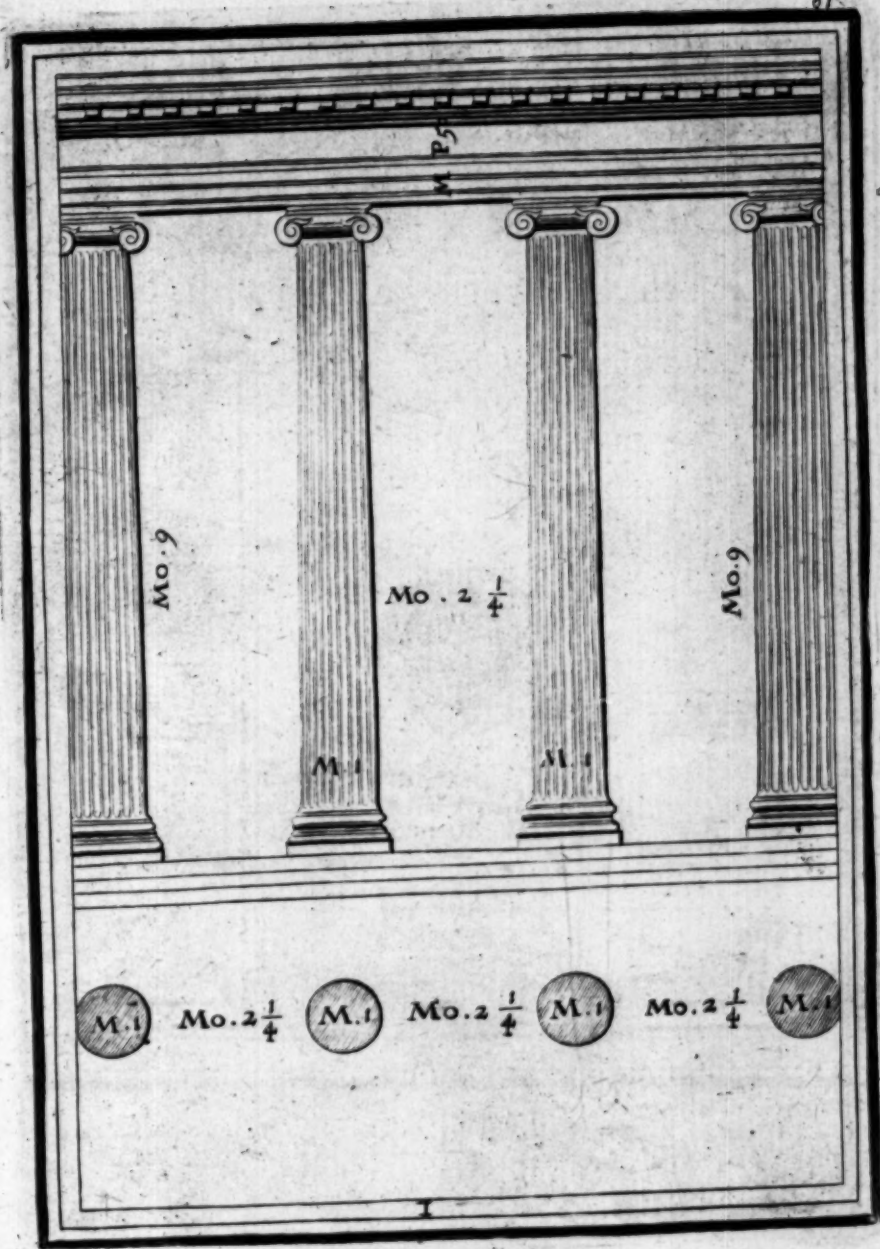
Of the Ionick Order.

THE *Ionick* Order had its Original in *Ionia* a Province in *Asia*; and we read, that the Temple of *Diana* at *Ephesus* was Built of this Order: The Columns, with Capital and Base, are Nine Models Long; and by a Model, is understood the Diameter of the Column below. The Architrave, Frize, and Cornice are the fifth Part of the Height of the Column, in the following Design, which is of Columns alone; the Inter-Columns are of two Diameters and a fourth Part. And this is the fairest and most commodious Manner of Inter-Columns, and by *Vitruvius* is call'd *Eustillos*. In the other Design, which is of Arches, the Pilasters are in Breadth a third Part of the Height of the Arch, and the Arches are in Height two Squares.

CHAP. XVI

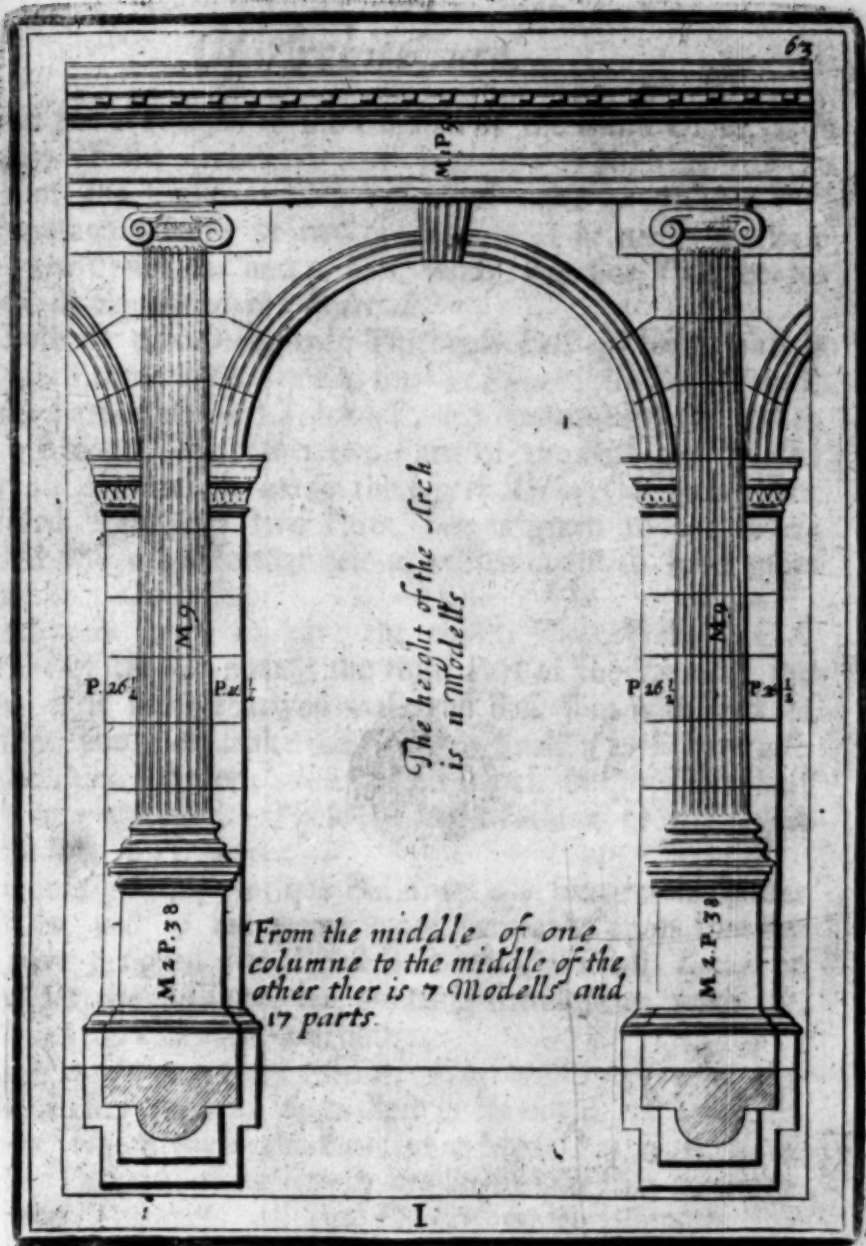
Of the Ionic Order

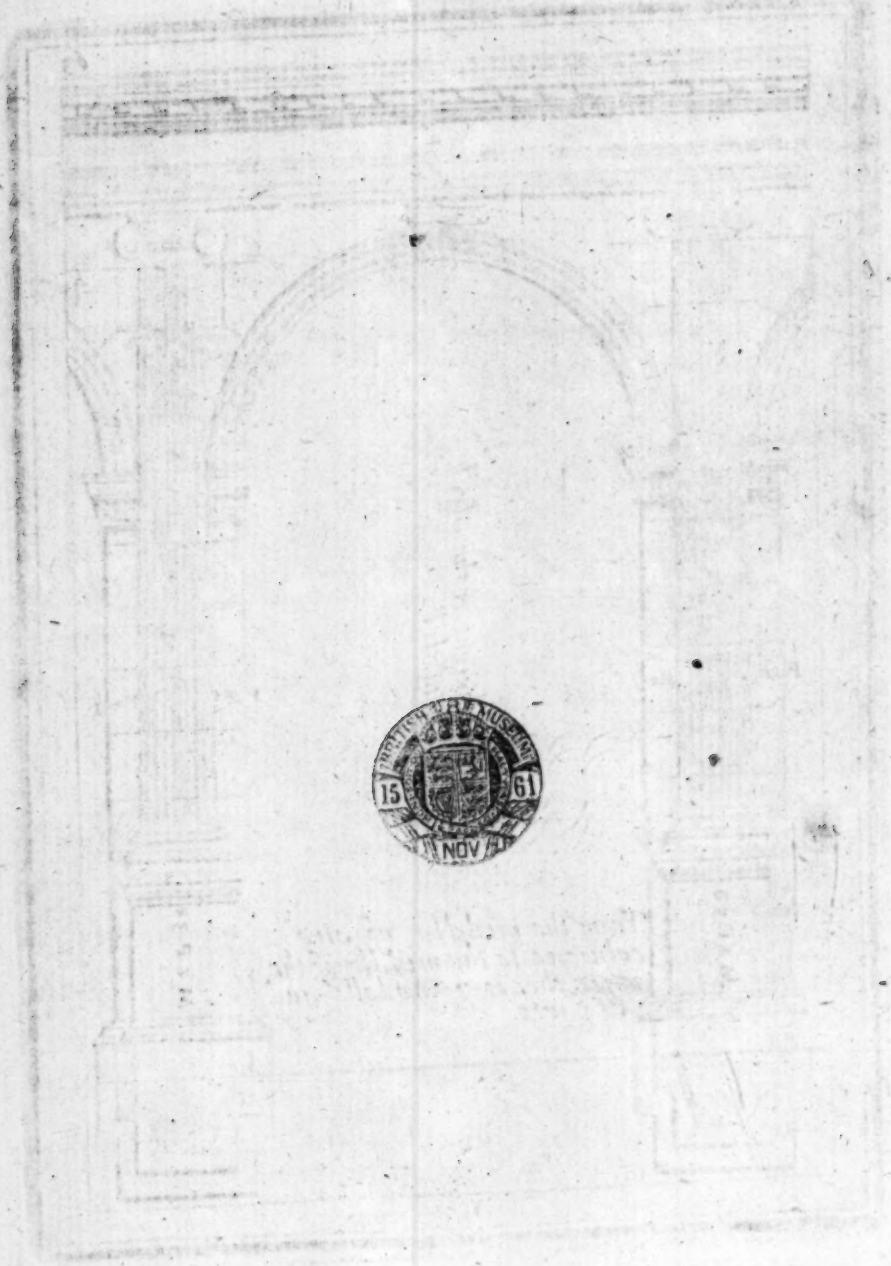
THE Ionic Order had its Original in Ionia a Province in Asia; and we read that the Temple of Diana at Ephesus was Built in this Order: The Columns with Capital and Base are Nine Models Long; and by a Model is understood the Diameter of the Column below. The Architects Fixe and Constant are the fifth Part of the Height of the Column in the following Design, which is of Columns alone; the later Columns are of two Diameters and a fourth Part. And this is the tallest and most commodious Manner of later Columns and by Virginius is called *Stylus*. In the other Design which is of Arches and Pediments are in Breadth a third Part of the Height of the Arch, and the Arches are in Height two Squares.



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If you put a *Pedestal* to the Column of the *Ionick* Order, as in the Design of the Arches, it must be made as High as half the Breadth of the Light of the Arch, and must be divided into seven Parts and a half; of two of them shall be made the Base of one; the *Cymatium* and a half, which remains, shall be for the *Dado*, or Square of the *Pedestal*.

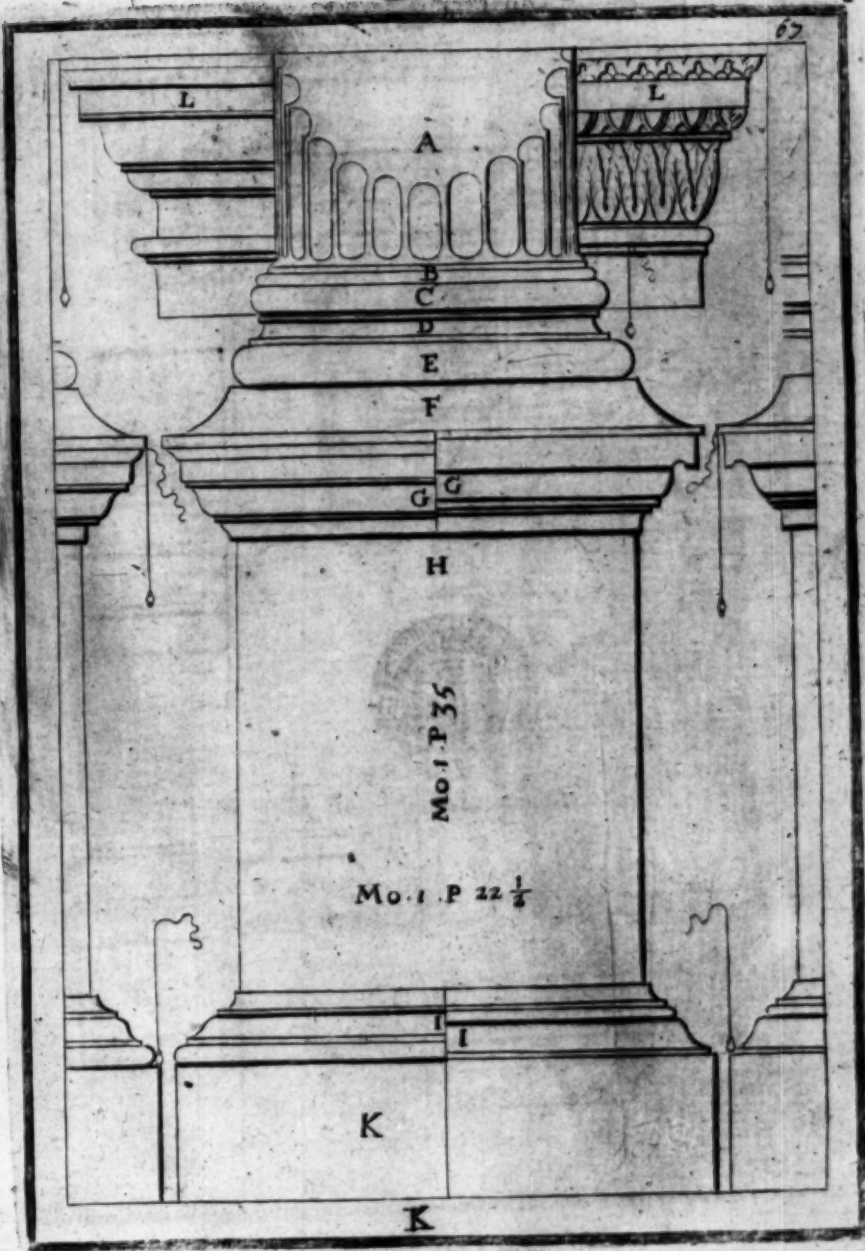
The Base of this Order is in Thickness half a Model, and is divided into three Parts; one is for the *Plinth*; its Projecture is the fourth Part of the said Thickness, and consequently the eighth Part of a Model. The other two Parts of the Base are divided into seven; of three is made the *Upper Torus*; the other four are divided again into two Parts, one is given to the *Scotia* above, and the other to that below, which ought to have more Projecture than the other.

The *Astragals* ought to have the eighth Part of the *Scotia*; the *Cincture* of the Column is the third Part of the *Torus* of the Base: But if it be so that you make the Base join with part of the Column, you must make the *Cincture* small, (as I have also said in the *Dorick* Order;) the *Cincture* hath in Projecture half the Projecture aforesaid. These be the Measures of the *Ionick* Base, according to *Vitruvius*.

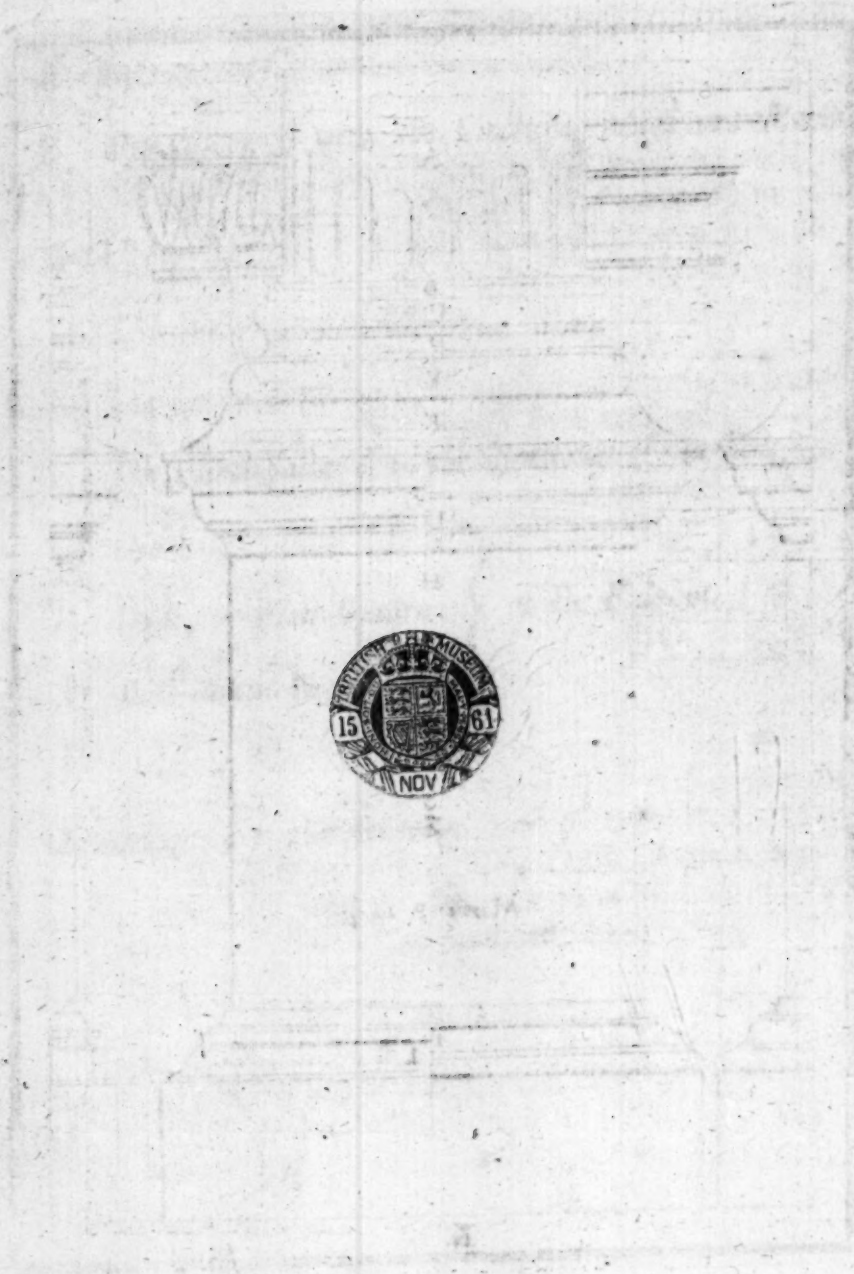
But because in many Antique Buildings are seen to this Order *Attick* Bases, and to me seems more agreeable upon the *Pedestal*, I have designed the *Attick* Base with a small *Torus* or *Astragal* under the *Cincture*; not omitting therefore to make the Design thereof as *Vitruvius* teacheth us.

The Designs *L* are two different Profiles for to make the Imposts of Arches; and of each there is set down the Measures by Numbers, which shew the Parts of a Model, as is done in all the other Designs; these *Imposts* are in Height half as much again as the Thickness of the *Pilaster* which supports the Arch.

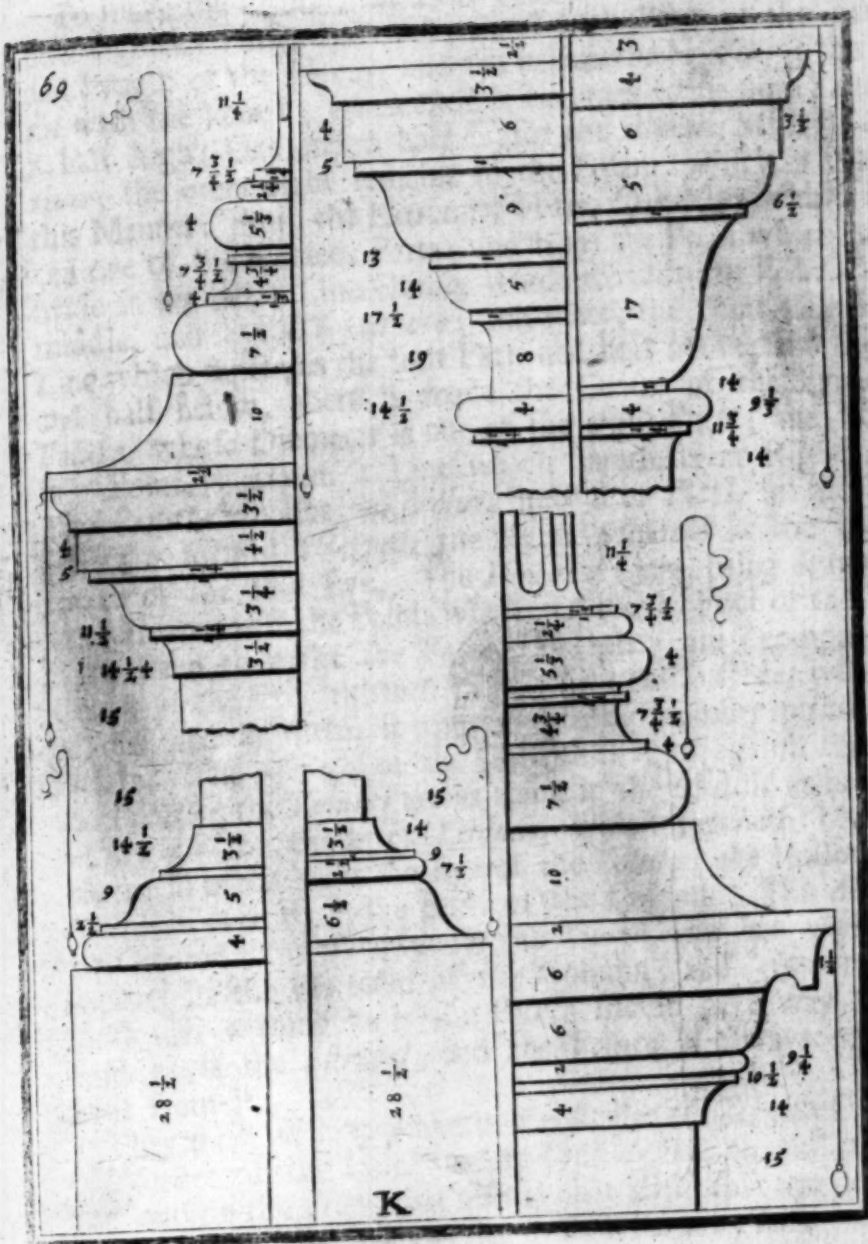
- If you put a Pedestal to the Column of the Doric Order, as in the Design of the Arch, it must be made of the same Material of the Light of the Arch, and must be divided into three Parts: one for the Base, one for the Shaft, and one for the Capital, or Square of the Pedestal.
- A** Body of the Column.
- B** The Astragal, with the Cincture, which are Members of the Column.
- C** Upper Torus.
- D** The Hollow, called Scotia.
- E** The Lower Torus.
- F** The Plinth fasten'd to the Cymatium of the Pedestal.
- G** Cymatium in two Forms.
- H** Dado, or Plain Square.
- I** Base in two Forms.
- K** Orlo, or Plinth.
- L** Imposts for the Arches.



Of Architecture



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To make the *Capital*, the Foot of the Column must be divided into eighteen Parts, and nineteen of such Parts is the Breadth and Length of the *Abacus*, and the half is the Height of the *Capital* with the *Voluta*; whereupon it becomes to be nine Parts and a half high: One and a half is for the *Abacus*, with its *Cymatium*; the other eight remains to the *Voluta*, which is made in this Manner: From the Extremity of the *Cymatium* within is placed one of the nineteen Parts; and from the Point which is there made is let fall a Line-Plumb, which divides the *Voluta* in the middle, and is call'd *Catheta*; and where the Point falls in this Line which separates the four Parts and half above, and the three and half below, there is made the Centre of the Eye of the *Voluta*, whose Diameter is one of the eight Parts; and from the said Point is drawn a Line which intersects at Right Angles. The *Catheta* divides the *Voluta* into four Parts, in the Eye of which is formed a Square, the bigness whereof is the half Diameter of the said Eye. The *Diagonal* Lines being drawn in it, in them are made the Points whereon the fixed Foot of the *Compass* is to stand to make the *Voluta*, and they are (computing the Centre of the Eye) thirteen Centres; as to the Order which must be observed in them, it appears by the Number placed in the Design. The *Astragal* of the Column is right against the Eye of the *Voluta*; the *Volutes* are as thick in the Middle as is the *Projection* of the *Ovolo* or *Echinus*, which reacheth beyond the *Abacus* so much as is the Eye of the *Voluta*; the Hollow of the *Voluta* is even with the Body of the Column. The *Astragal* of the Column turns about under the *Voluta*, and is always seen, as appears in the Platform of the Column; and 'tis natural, that so slender a thing as is the *Voluta* should give way to one so hard as is the *Astragal*; and the *Voluta* is always equally distant from it.

They were wont to make in the Angles of Rows of Columns, or Porches of the *Ionick* Order, *Capitals*, which had the *Voluta* not only in the Front, but also in that Part, that making the *Capital* as they were wont to do, would be the Flank; whereupon they come to have the Front on two Sides, and are called *Angular Capitals*: and how they made them, I shall demonstrate in my Book of *Temples*.

- A *Abacus.*
- B *Hollows of the Voluta.*
- C *Ovolo, or Echinus.*
- D *Astragal under the Echinus.*
- E *Cincture, or Annulet.*
- F *Body of the Column.*
- G *Line call'd Carbeta.*

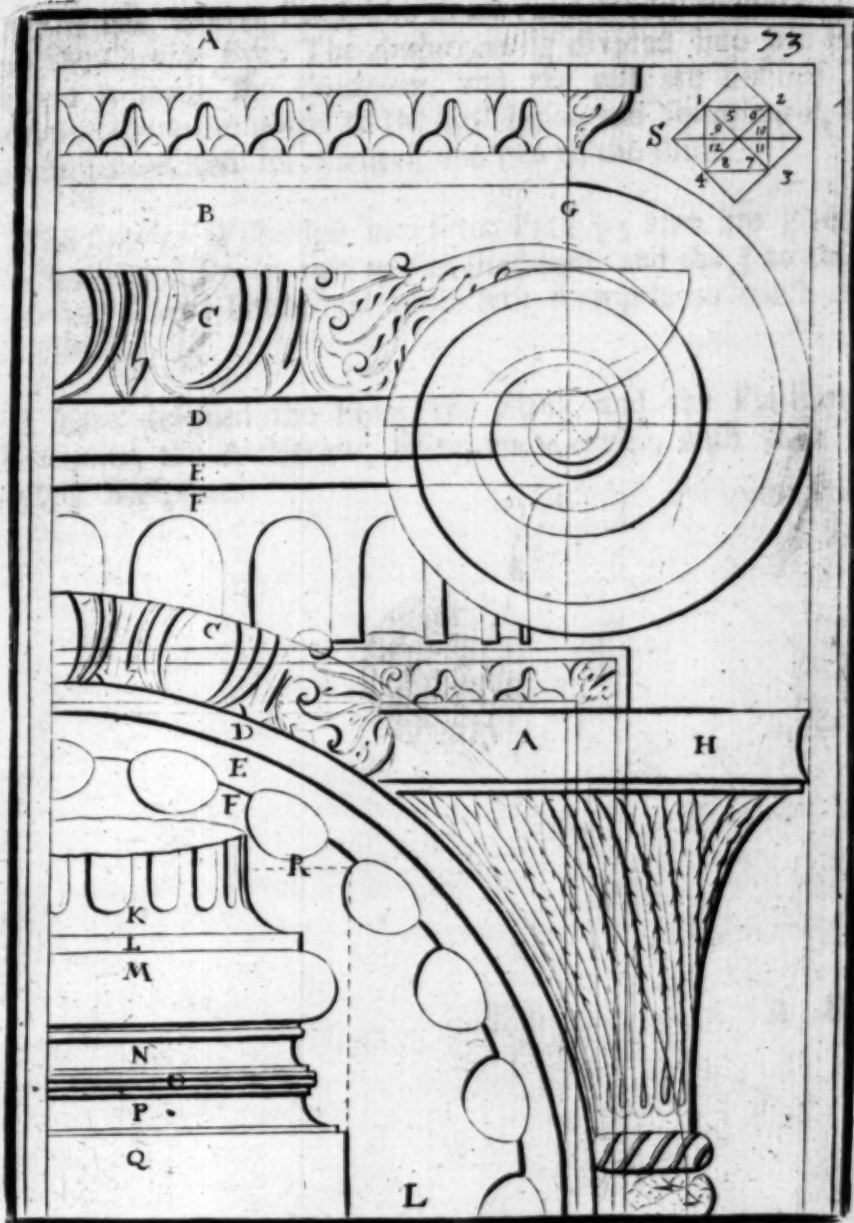
On the Platform of the Capital of the Column the said Members are marked with the same Letters.

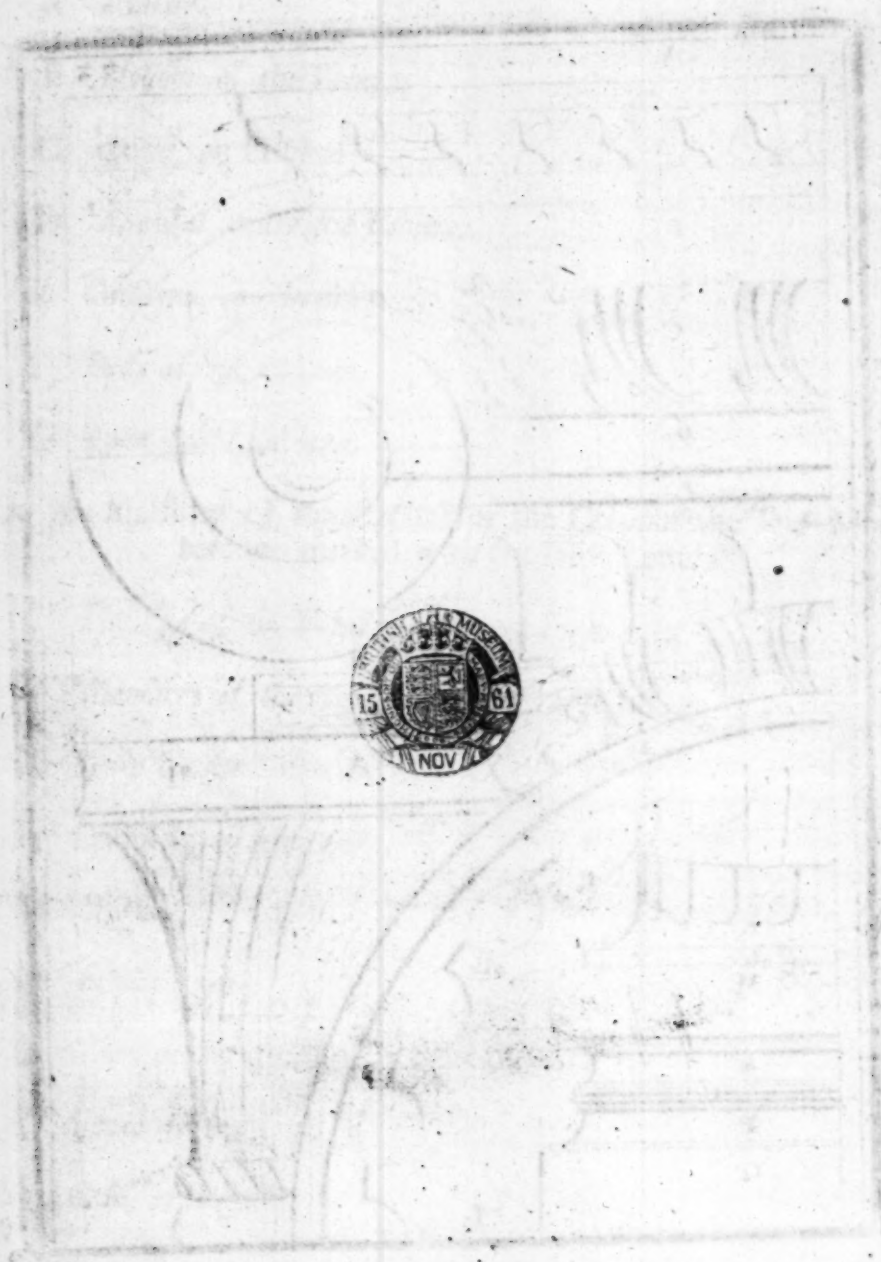
- S *The Eye of the Voluta in a large Form.*

Members of the Base, according to Vitruvius.

- K *Body of the Columns.*
- L *Cincture, or Annulet.*
- M *Terrus.*
- N *Scocia prima.*
- O *Tondino, or Astragal.*
- P *Scocia secunda.*
- Q *Orlo, or Plinth.*
- R *Projecture of the Base.*

The





The *Architrave*, *Frize*, and *Cornice*, make (as I have said) the fifth Part of the Height of the Column; and the Whole is divided into twelve Parts, the *Architrave* four, the *Frize* three, and the *Cornice* five: The *Architrave* is divided into five Parts, of one is made the *Cymatium*, and the rest are divided into twelve; three are given to the first *Fascia* and its *Astragal*, four to the second and its *Astragal*, and five to the third.

The *Cornice* is divided into seven Parts $\frac{3}{4}$; two are given to the *Scotia* and *Ovolo*, two to the *Modillions*, and the $\frac{3}{4}$ to the *Corona* and *Schima Retta*, and projecteth forwards as much as its Thickness.

I have designed the Front, the Flank, and the Platform of the *Capital*, the *Architrave*, *Frize*, and *Cornice*, with their convenient Sculptures.

L 2

A Schima

A *Schima Recta.*

B *Schima Reversa.*

C *Corona.*

D *Cymatium of the Modillions.*

E *Modillions.*

F *Ovolo.*

G *Cavetto.*

H *Frize.*

I *Cymatium of the Architrave.*

K L M *are the first, second, and third Fascia.*

Members of the Capital.

N *Abacus.*

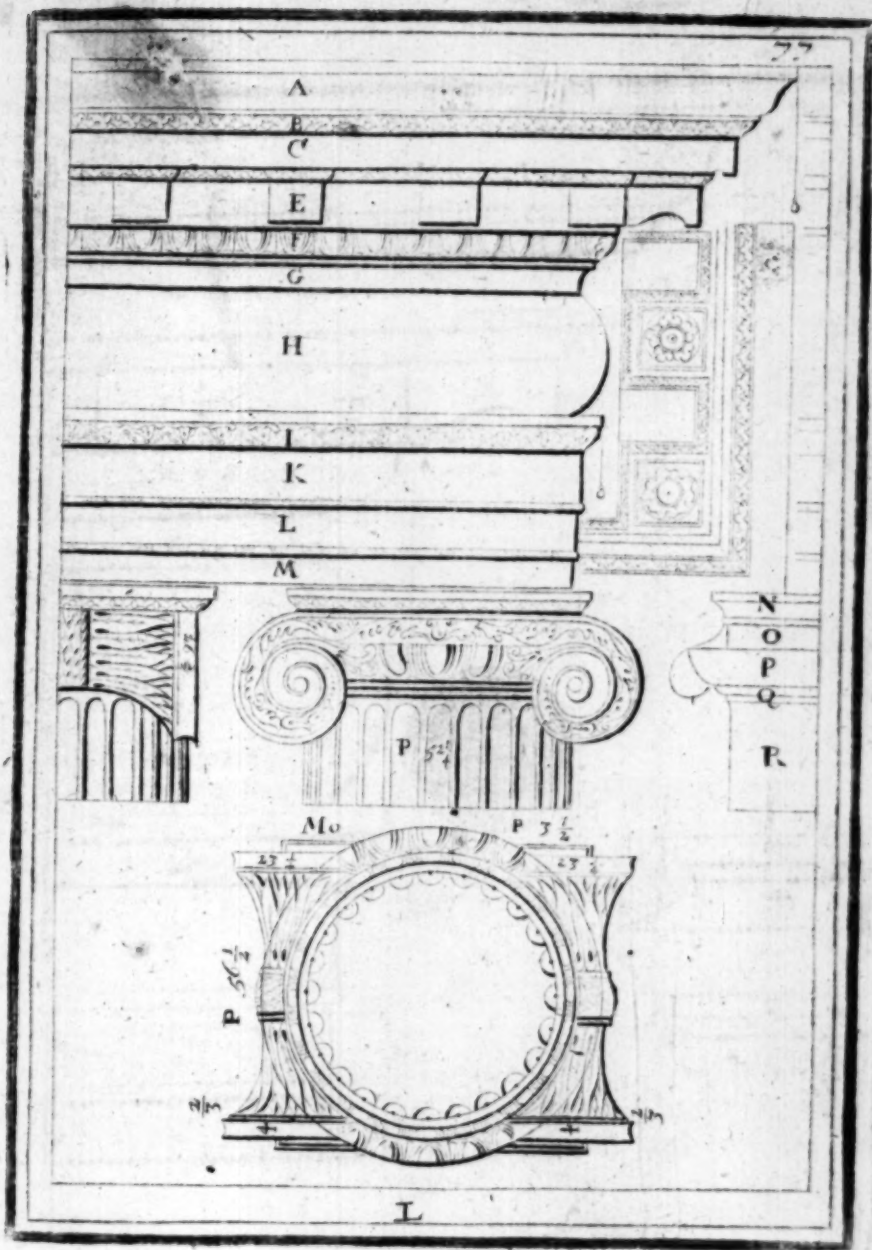
O *Hollow of the Voluta.*

P *Ovolo, or Echinus.*

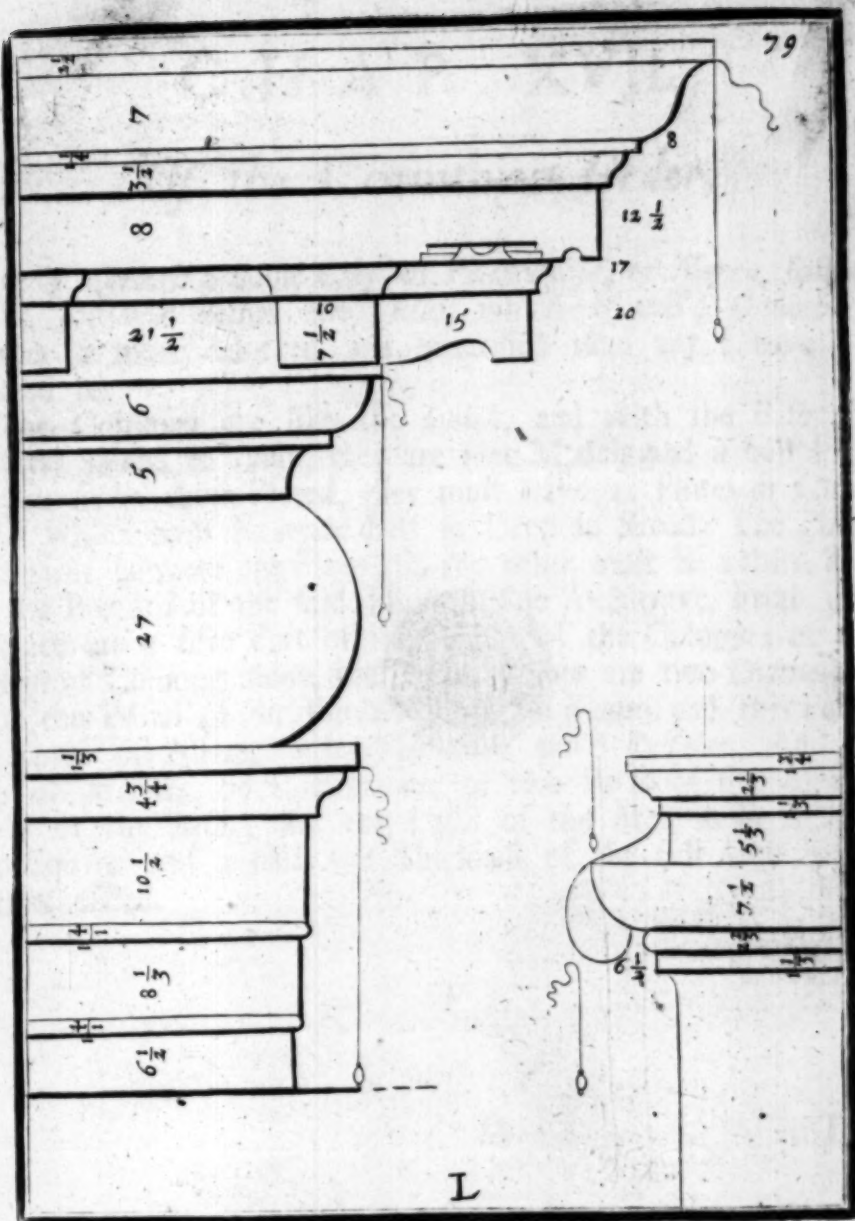
Q *Astragal of the Column.*

R *Body of the Column.*

CHAR









C H A P. XVII.

Of the Corinthian Order.

AT *Corinth* a noble City of *Peloponnese*, or *Morea*, first of all was found the Order which is call'd *Corinthian*, which is more Adorned and Beautified than any I have yet treated on.

The Columns are like the *Ionick*, and with the Base and Capital joined to them, they are nine Models and a half long. If you make them Fluted, they must have 24 Flutes or Channels, which must be made half so Deep as Broad: The Plains or Spaces between one Flute and the other must be a third Part of the Breadth of the said Flutes. The Architrave, Frize, and Cornice are a fifth Part of the Height of the Column; in the Design of Columns alone, the Inter-Columns are two Diameters, as is the Portal of *St. Maria Rotunda* in *Rome*; and this Form of Rows of Pillars, is by *Vitruvius* call'd *Systylos*. And in that of Arches, the Pilasters are of two Parts of five of the Light of the Arch; and the Light of the Arch is in Height two Squares and a half, the Thickness of the first Arch being comprehended.

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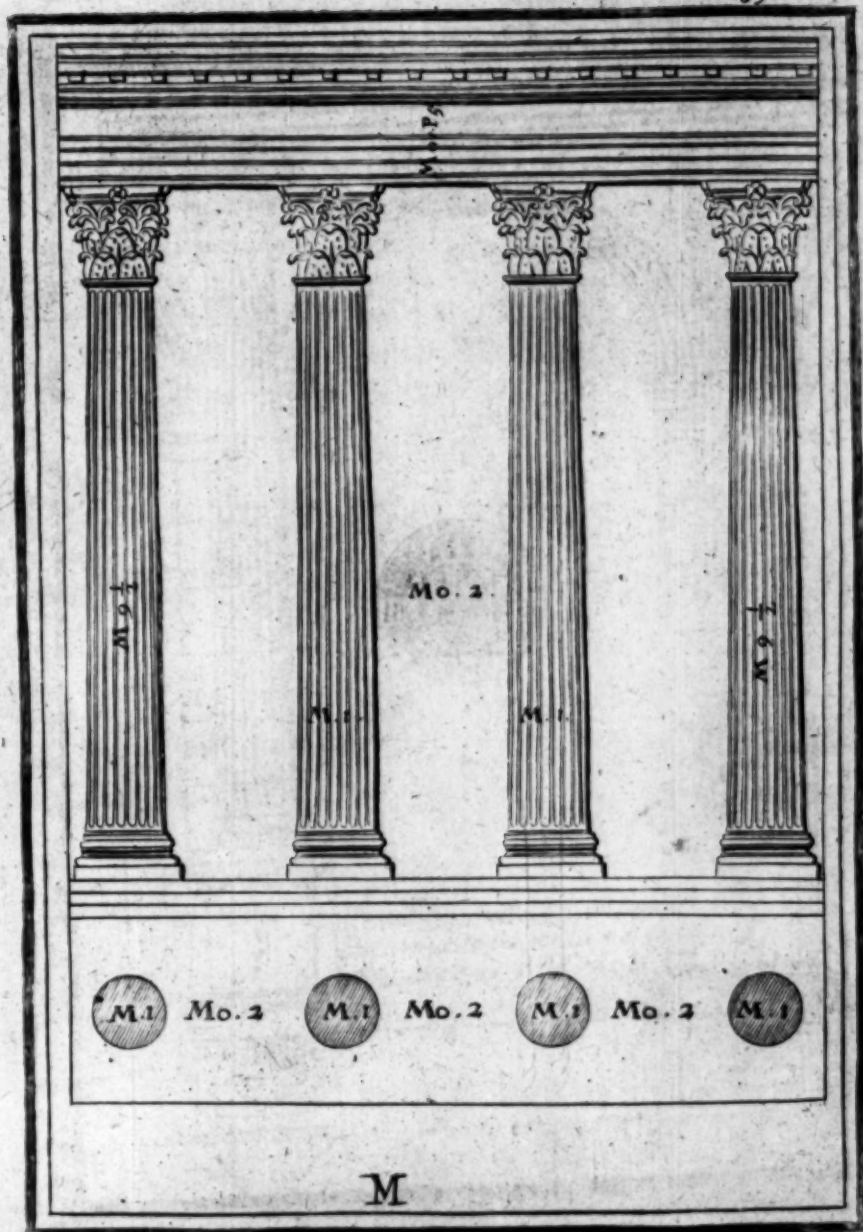
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C H A P. XVII.

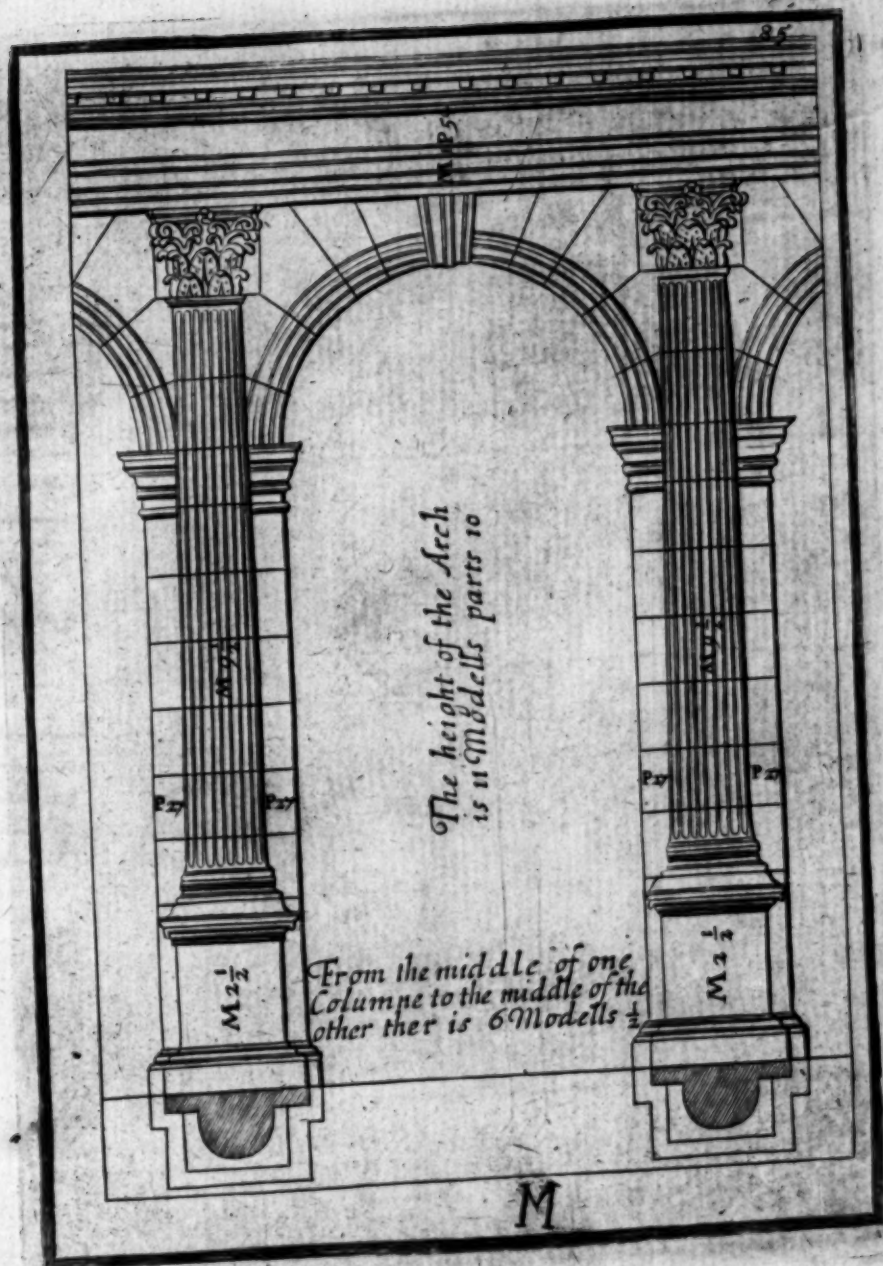
Of the Corinthian Order.

AT Corinth a noble City of Peloponnesus, or Achaia, first of all was found the Order which is call'd Corinthian, which is more Adorned and Beautified than any I have yet treated on.

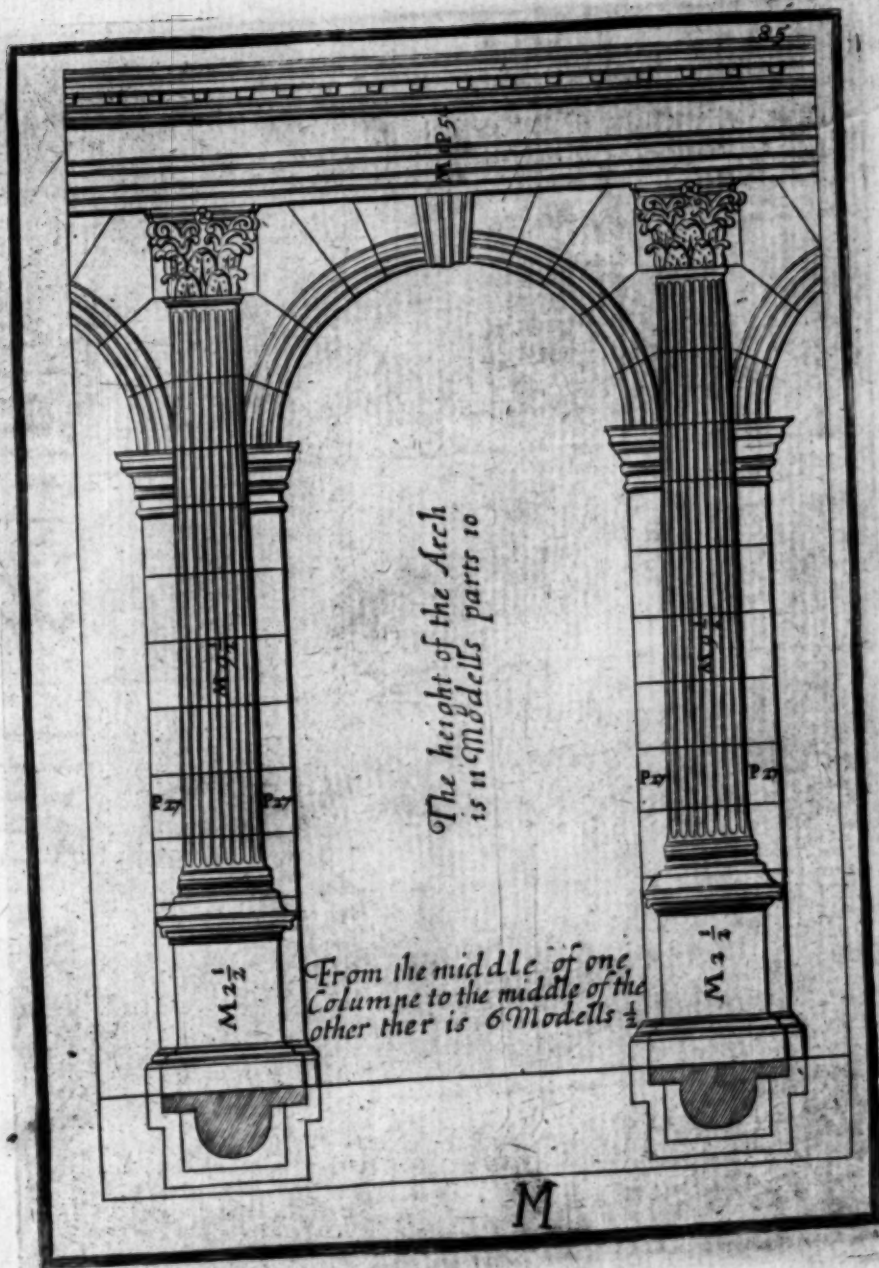
The Columns are like the Ionic, and with the Base and Capital joined to them, they are nine Models and a half long. If you make them Fluted, they must have as Flutes or Channels, which must be made half so Deep as Broad: The Flutes or Spaces between one Flute and the other must be a third Part of the Breadth of the said Flutes. The Architrave, Frieze, and Cornice are a fifth Part of the Height of the Column; in the Design of Columns alone, the four Columns are two Diameters, as is the Portico of the Temple of Minerva in Rome; and this Portico of Rows of Pillars is by Vitruvius call'd Styrus. And in that of Arches, the Pillars are of two Parts of five of the Light of the Arch; and the Light of the Arch is in Height two Squares and a half, the Thickness of the said Arch being comprehended.

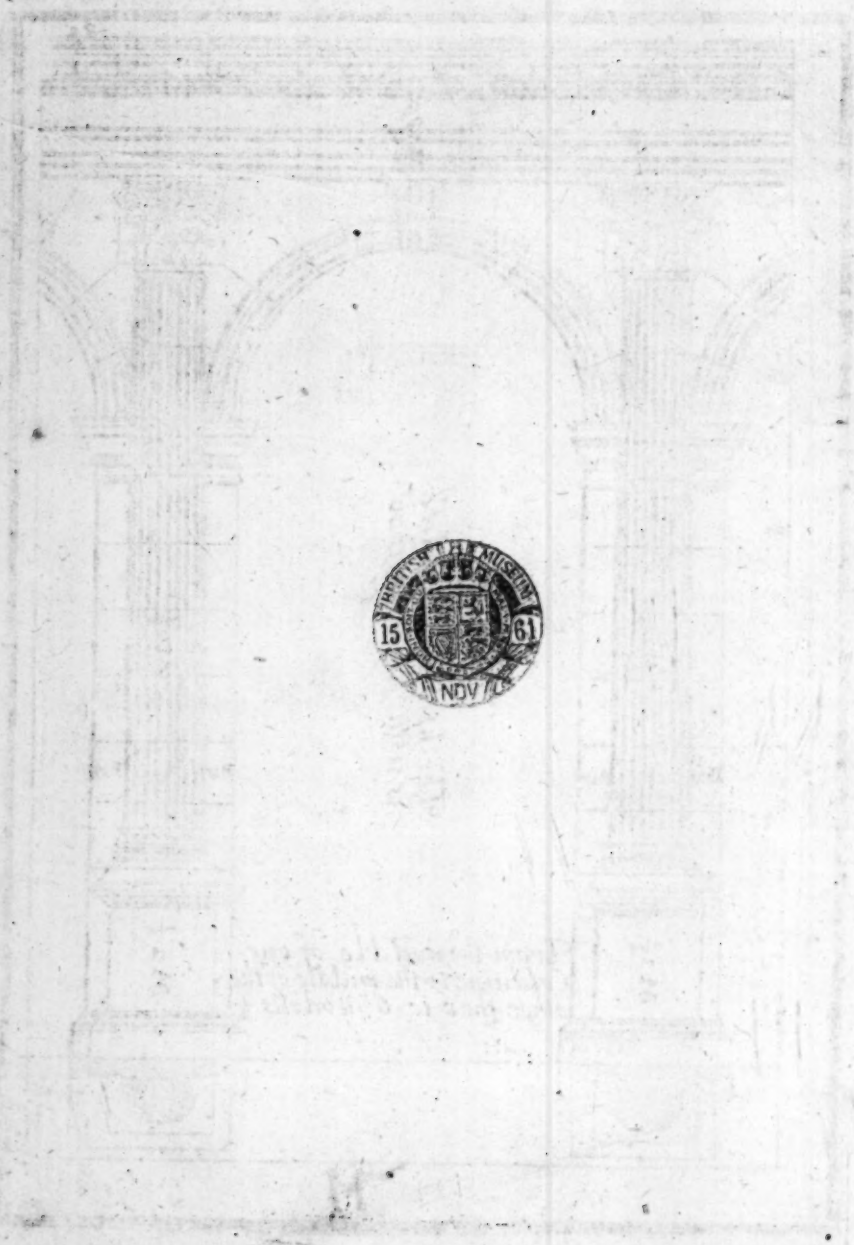












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The *Pedestal* under the *Corinthian* Column must be in Height a fourth Part of the Length of the Column; and being divided into eight Parts, one is given to the *Cimatium*, two to its *Base*, and five remains to the *Dado* or Plane of the *Pedestal*; the *Base* must be divided into three Parts, two for the *Zocco* or *Plinth*, and one to the *Cornice*.

The *Base* of the Column is the *Attick*, but in this Order it differs from that which is put to the *Dorick* Order: In this the *Projeſſure* is the fifth Part of the Diameter of the Column, whereas in the *Dorick* it is the sixth Part; it may also vary in some other Parts, as may be seen in the Design, where also is set down the *Impoſts* of the Arches, the which is in Height one half more than the Thickness of the *Membretto*, that is to say, the *Pilaſter* which bears up the Arch.

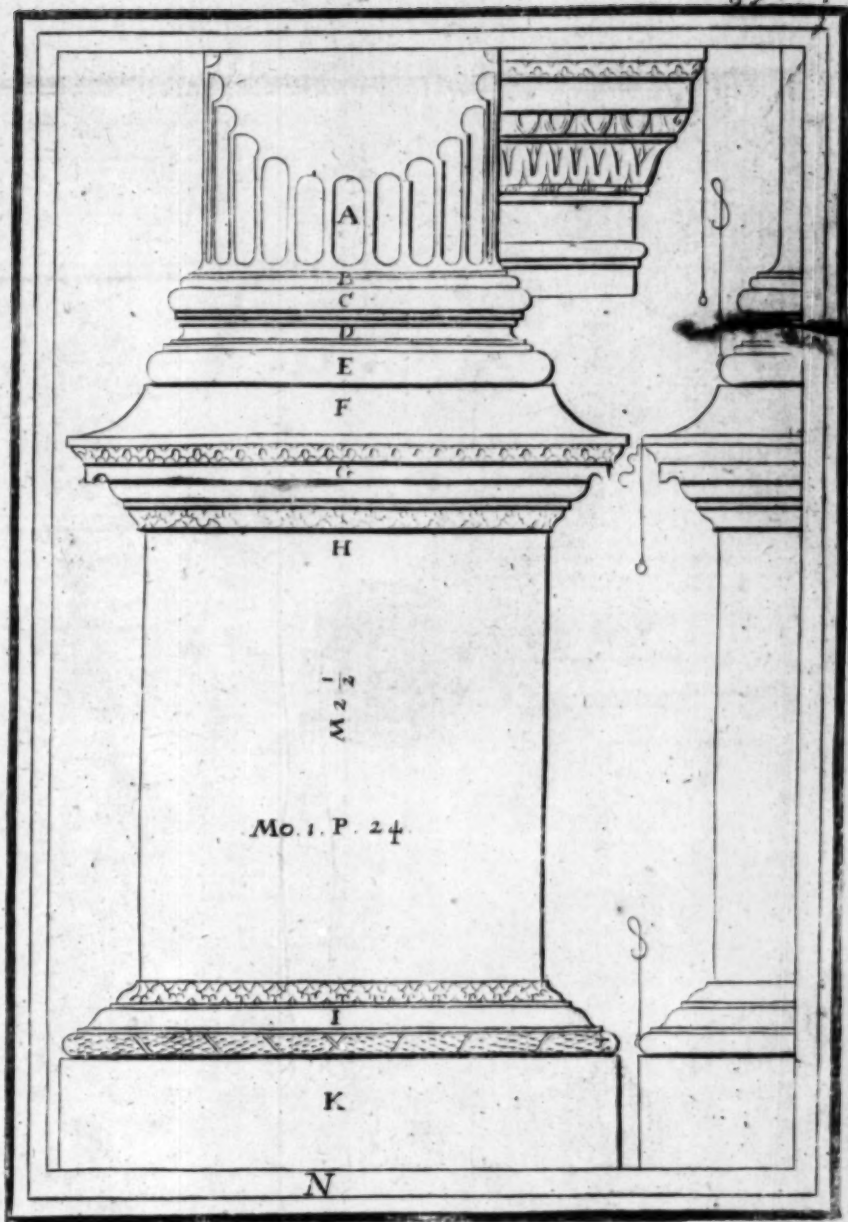
G Cimatium
H Dado, or Plinth
I Corona of the Base
K Zocco, or Plinth of the Base

The Impoſts of the Arch is at the Side of the Column.

A Body

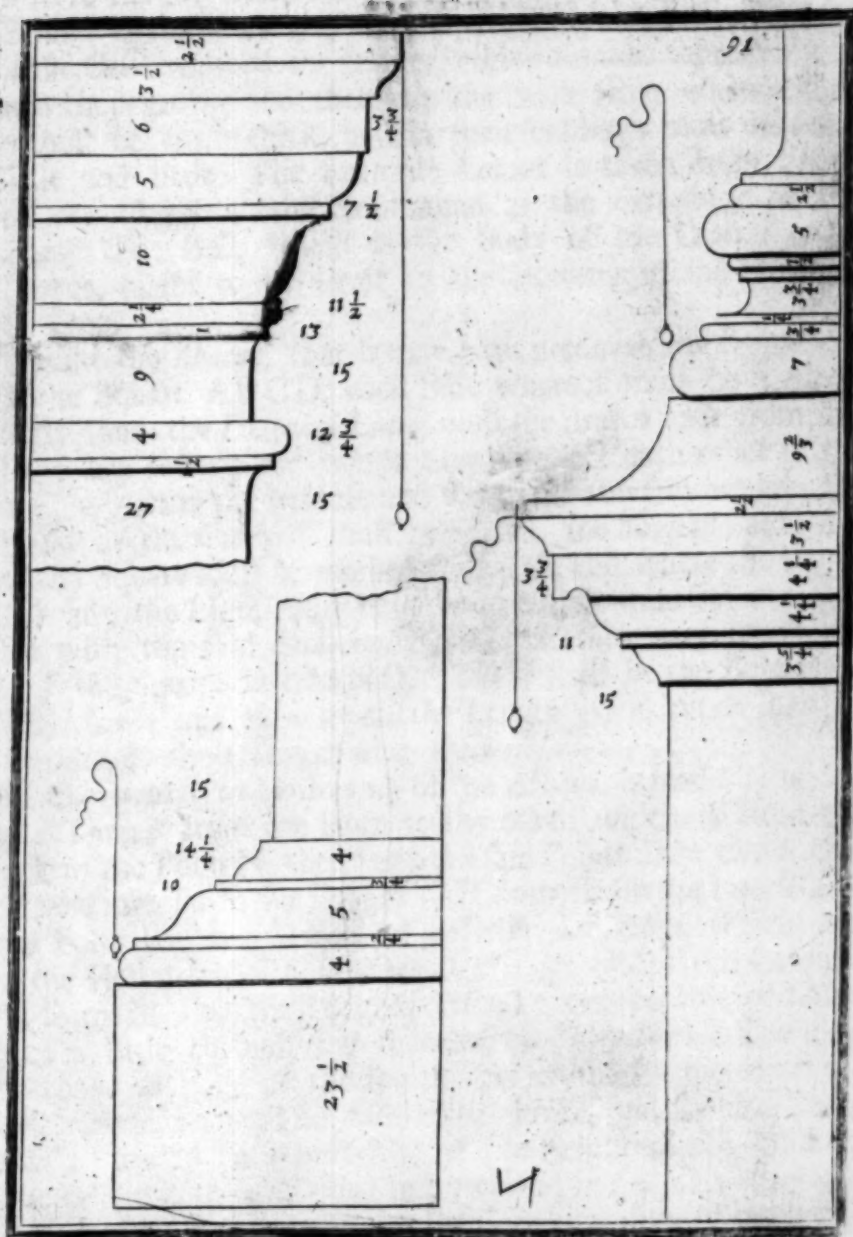
- The Pedestal under the Corinthian Column must be divided into four Parts, one is given to the Base, one to the Torus, one to the Scotia, and one to the Corona.*
- A** *Body of the Column.*
- B** *Cincture and Astragals of the Column.*
- C** *The Upper Torus.*
- D** *Scotia, with the Astragals.*
- E** *The Lower Torus.*
- F** *Orlo, or Plinth of the Base, fasten'd to the Cimatium of the Pedestal.*
- G** *Cimatium*
- H** *Dado, or Plain* } *of the Pedestal.*
- I** *Corona of the Base*
- K** *Orlo, or Plinth of the Base.*

The Imposts of the Arch is at the Side of the Column.



of architecture





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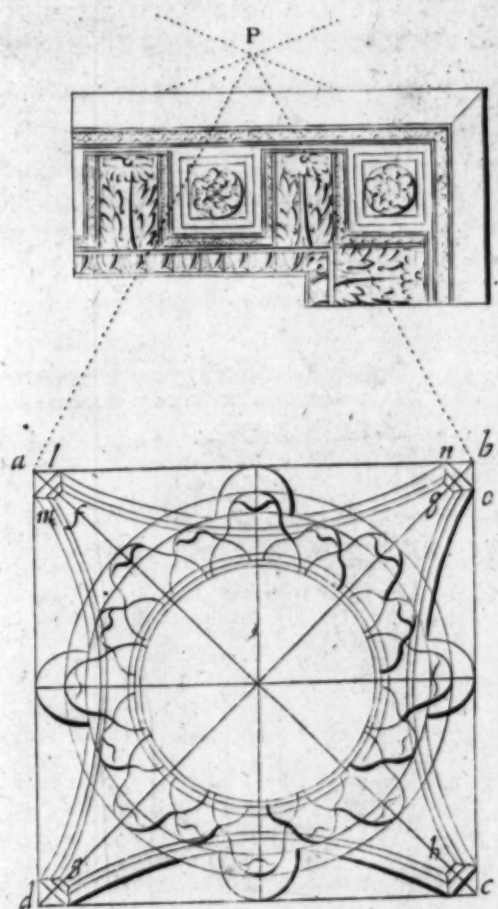


The *Corinthian Capital* ought to be as high as the thickness of the Column below, and a sixth Part more, which is allowed to the *Abacus*; the rest is divided into three equal Parts, the first is given to the first Leaf, the second to the second, and the third is divided again into two, and of that Part next the *Abacus* is made the *Caulicoli*, with the Leaves, which seem to support them, whence they grow; and therefore the Stalk from whence they grow must be made thick, and in their Foldings must diminish by little and little: The Example hereof is taken from Plants which are bigger at the Root than at the extremity of the Branches. The Bell, which is the Body of the *Capital* under the Leaves, ought to be direct to the Bottoms of the Flutes of the Column.

To make the *Abacus*, that it may have a convenient *Projecture*, make the Square *ABCD*, each Side whereof must be a *Model* and half; and the *Diagonal Lines* must be drawn in it from one Angle to the other; and where they intersect each other in the Point *E*, which is the Middle and Centre of the said Square, the fixed Foot of the Compass must be placed, and towards each Angle of the Square must be marked a *Model*; and where the Points *F G H I* are, the Lines must be drawn which intersect at Right Angles with the said *Diagonals*, and that they may touch the sides of the Square in *LMNO*. These shall be the Bounds of the *Projecture*; and how much the Length is, so much shall be the Breadth of the Horns of the *Abacus*.

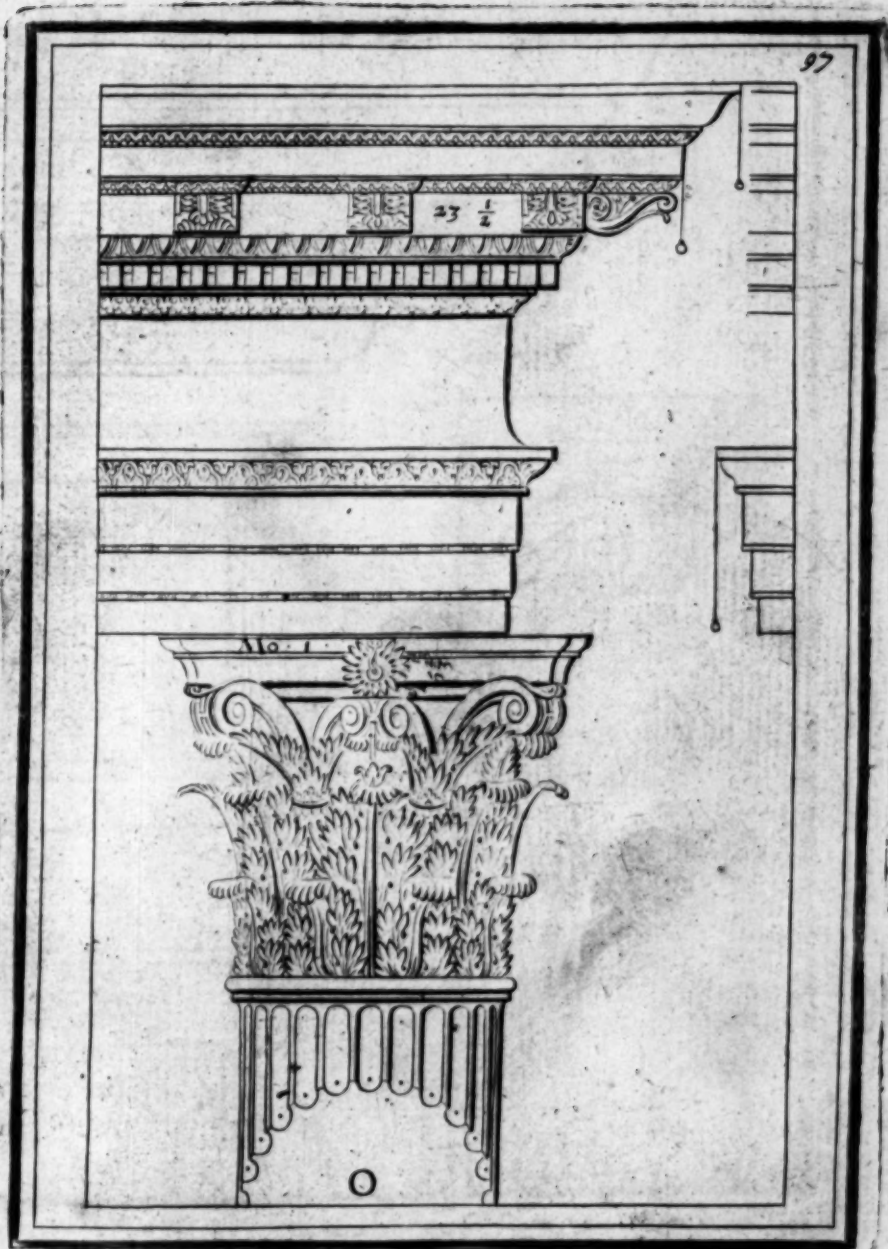
The *Curvature*, or Hollowing of the *Abacus*, is made by laying along a Thread from one Horn to the other, which is from the Point *L* to the Point *N*, then from the said Points draw two Arches of Circles, then set in one Foot of the Compasses in the Intersection at the Point *P*; with the other describe the Arch, which will make the Hollowing or Curvature of the *Astragal* of the Column, and is so made, that the Tongues of the Leaves touch it, or rather advance a little beyond, and this is their *Projecture*. The Rose ought to be as large as the fourth-Part of the Diameter of the Column at the Foot: The *Architrave*, *Frize*, and *Cornice*, (as I have said) are to be a fifth-Part of the Height of the Column, and the whole is to be divided into twelve Parts, as in the *Ionick*: But here is the difference; in this the *Cornice* is divided into eight

Parts and half; of one is made the *Intabliment*, of the other the *Denticuli*, of the third the *Ovolo*, of the fourth and fifth the *Modillions*, and of the other three and half the *Corona* and the *Schima*. The *Cornice* hath as much *Projecture* as it is high; the *Coffers* or *Places* of the *Roses* that go between the *Modillions* must be *Square*, and the *Modillions* as big as half the *Plain* of the said *Roses*. The *Members* of this *Order* have not been marked with *Letters*, as the foregoing, because by them these may easily be understood.

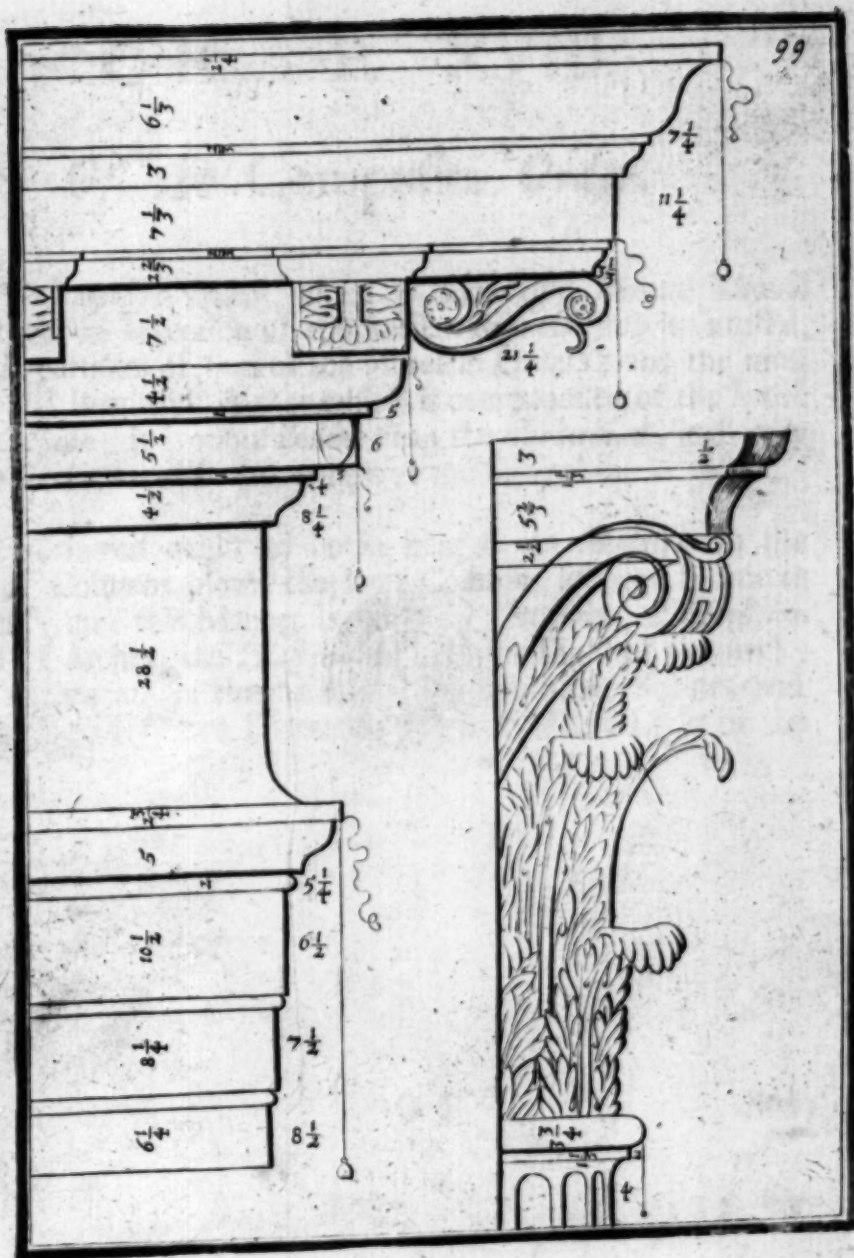


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C H A P. XVIII.

Of the Composita Order.

THE *Composita* Order, which is also call'd *Roman*, because it was an Invention of the Ancient *Romans*, and is so call'd, because it partakes of two of the aforesaid Orders; and the most Regular and Beautiful, is that which is compounded of the *Ionick* and *Corinthian*; it is more slender than the *Corinthian*; and may be made like it in all Parts, except in the *Capital*.

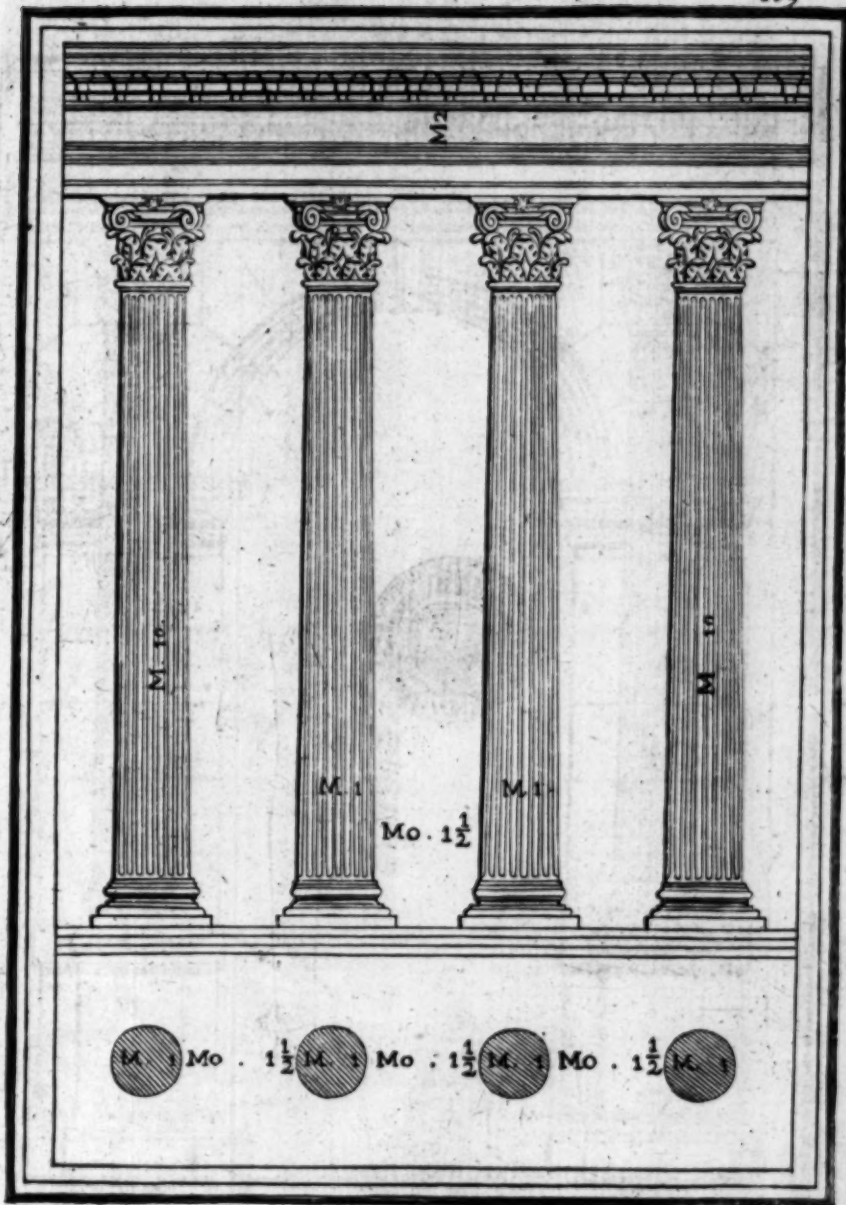
These Columns ought to be in Length ten *Models*: In the Design of Columns alone, the Inter-Columns are one Diameter and a half; and this Manner is call'd by *Vitruvius*, *Picknostilos*. In those of Arches, the *Pilasters* are half the Light of the Arch; and the Arches are in Height under the Vault two Squares and half, that is to say, two Diameters and half of the Light of the Arch.

CHAP. XVIII.

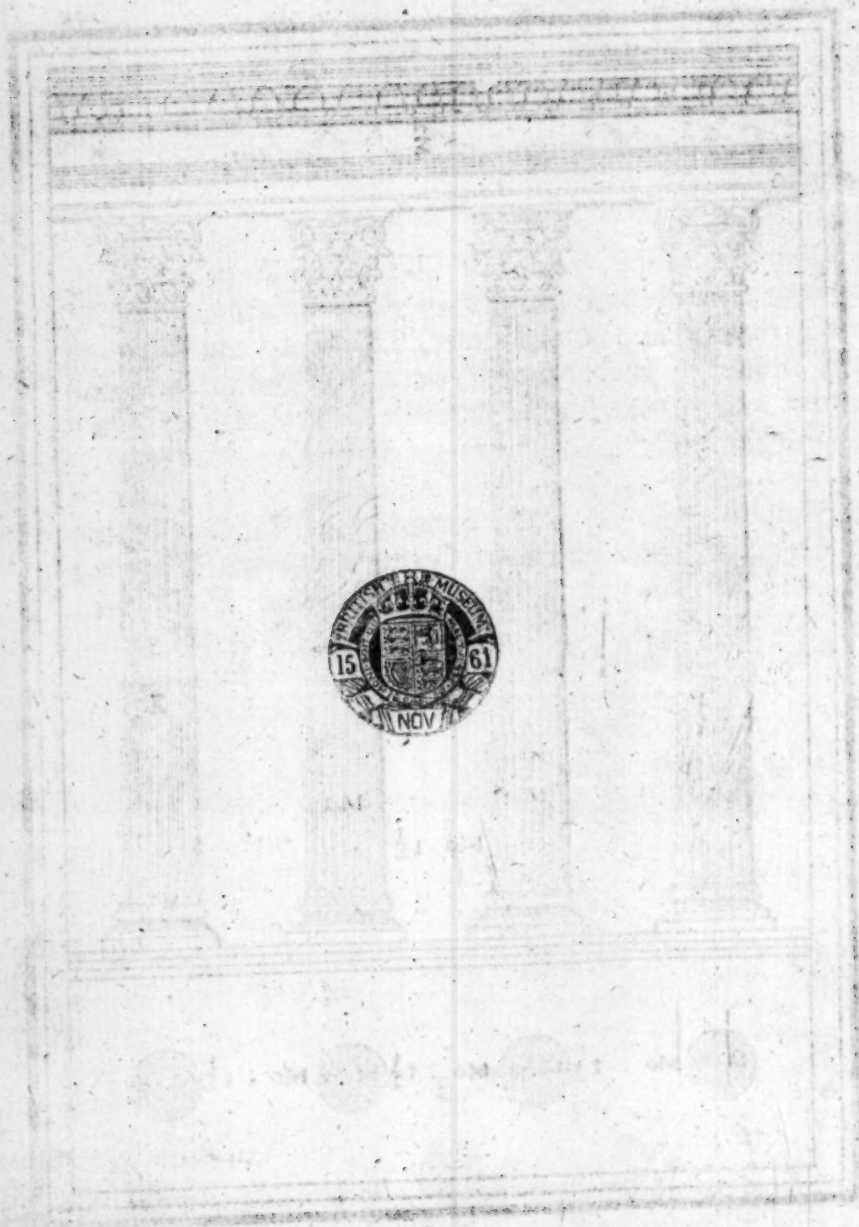
Of the Composite Order.

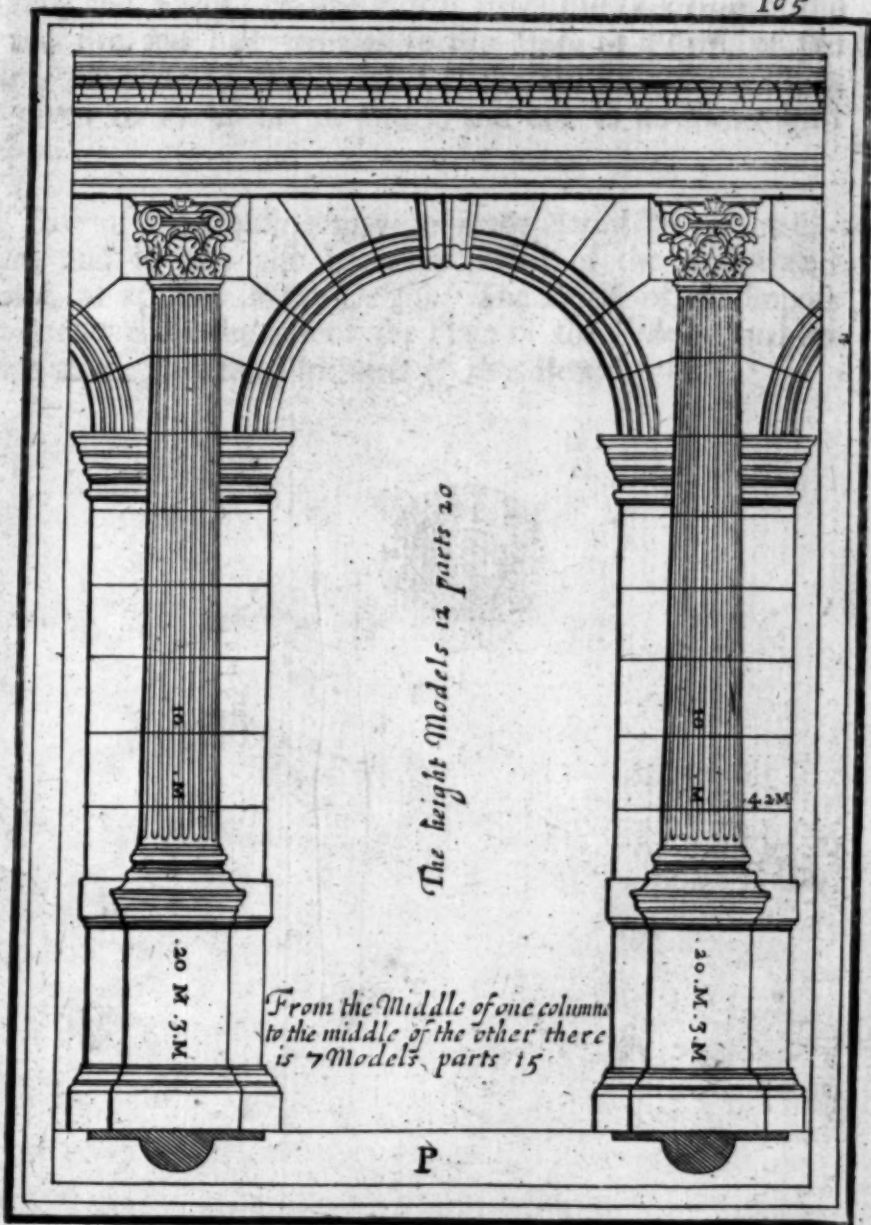
THE Composite Order, which is also called Roman, because it was an invention of the Ancient Romans, and is so called, because it partakes of two of the stoical Orders; and the most Regular and beautiful, is that which is compounded of the Ionic and Corinthian; it is more slender than the Corinthian; and may be made like it in all Parts, except in the Capital.

These Columns ought to be in Length ten Moduli: In the Design of Columns alone, the Inter-Columns are one Diameter and a half; and this Measure is called by Vitruvius, Pictura. In those of Arches, the Pilasters are half the Light of the Arch; and the Arches are in Height under the Vault two Squares and half; that is to say, two Diameters and half of the Light of the Arch.



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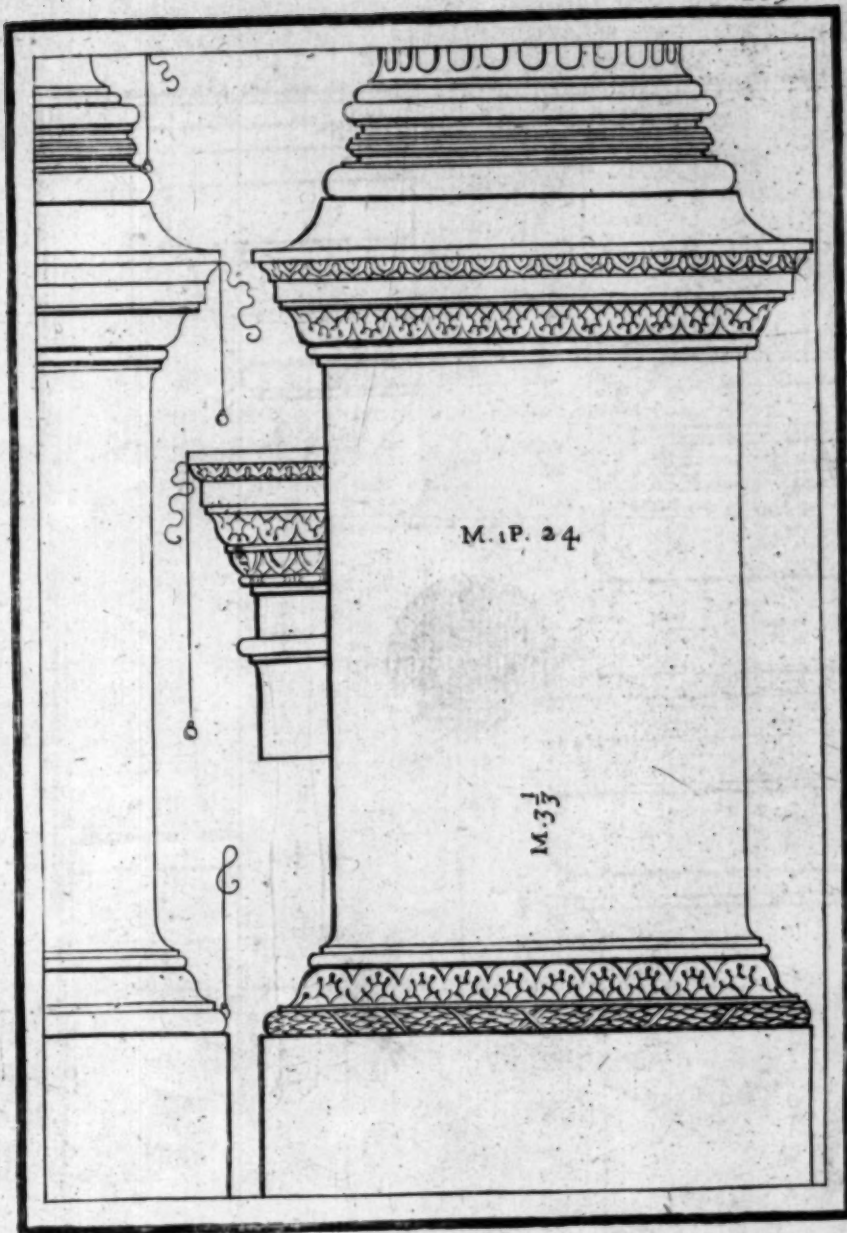


And because (as I have said) this Order ought to be made more neat and slender than the *Corinthian*, its *Pedestal* is to be the third Part of the Height of the Column, and is divided into eight Parts and a half; of one Part is made the *Cymatium* of the *Base*, and five and half remains to the *Dado* or *Plinth*, of the *Pedestal*, the *Base* of the *Pedestal* is divided into three Parts, two is given to the *Zocco* or *Plinth*, and one to its *Torus* with *Cymatium*.

The *Base* of the Column may be made *Attick*, as in the *Corinthian*; and it may also be compounded of the *Attick* and the *Ionick*, as appears in the Design. The *Profile* of the *Impost* of the *Arches* is by the side of the *Plain* of the *Pedestal*, and its Height is as much as the Thickness of the *Membretto*.

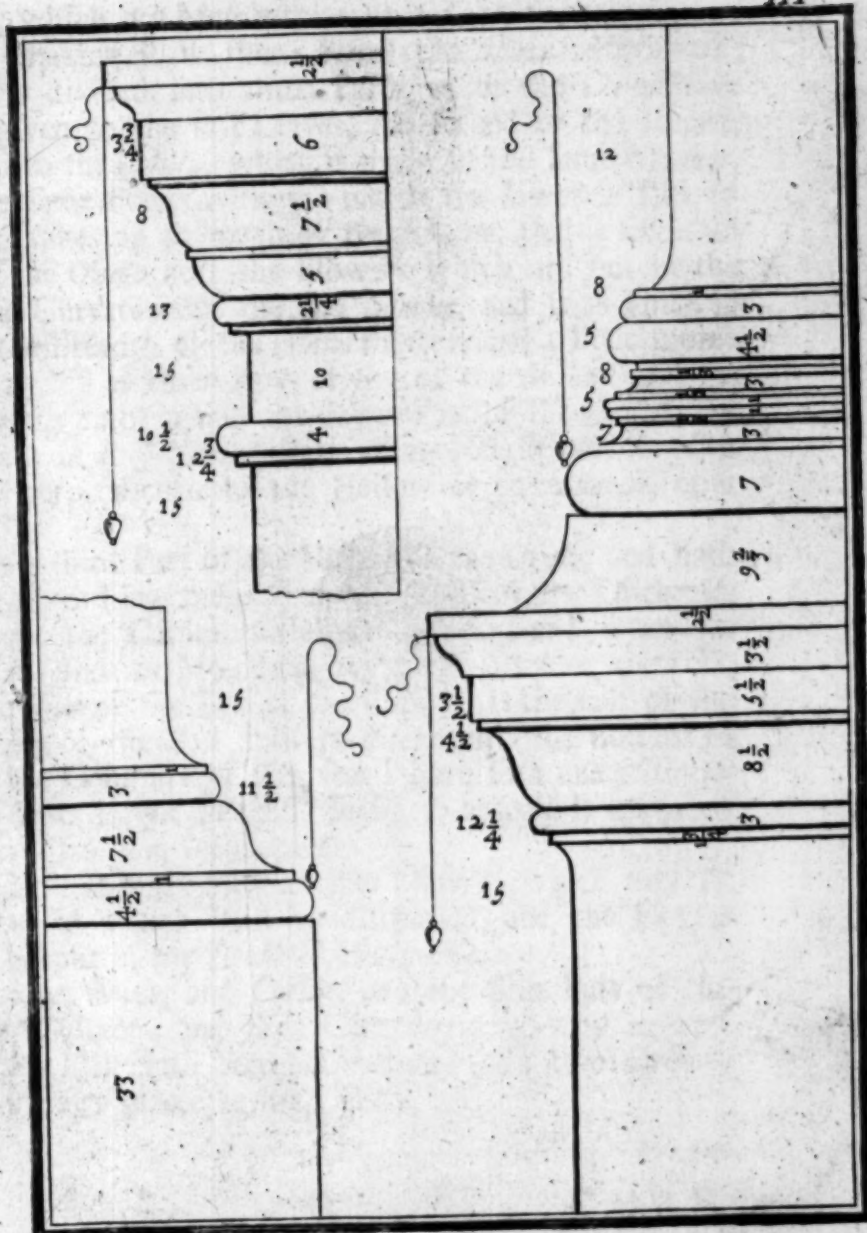
And because (as I have said) this Order ought to be made more near and slender than the Corinthian, its Frieze is to be the third Part of the Height of the Column, and is divided into eight Parts and a half: of one Part is made the Cornice of the Base, and five and half remains to the Frieze of three Parts, the Base of the Pedestal is divided into three Parts, two is given to the Base of the Column, and one to the Base with Cornice.

The Base of the Column may be made thick as in the Corinthian, and it may also be compounded of the three, and the base as appears in the Design. The Profile of the Impost of the Arch is by the side of the Base of the Pedestal, and its Height is as much as the Thickness of the Abacus.



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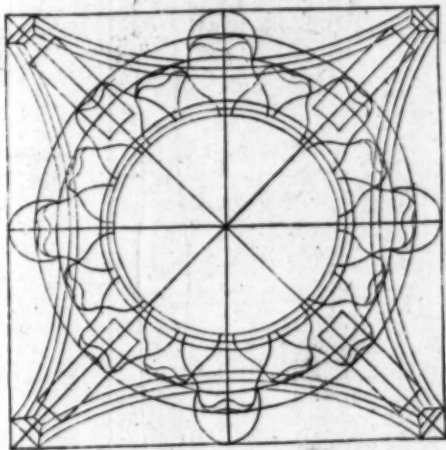
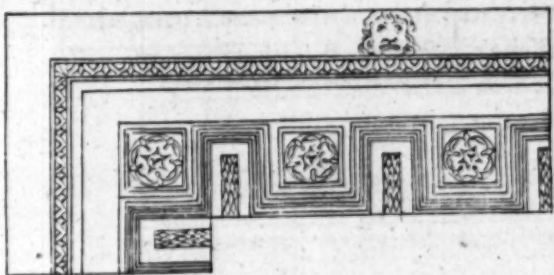
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The Capital of the *Composita* Order hath the same Measures as the *Corinthian*; but it differs from it in the *Voluta*, *Ovolo*, *Fusarolo* or *Fuse*, which are Members attributed to the *Ionick*; and the way of making it is thus: From the *Abacus* downwards the Capital is divided into three Parts, as in the *Corinthian*: The first is given to the first Leaves, the second to the second, and the third to the *Voluta*, which is made in the same Manner, and with the same Points with the which the *Ionick* is said to be made, and takes up so much of the *Abacus*, that it seems to grow out of the *Ovolo* near the Flowers which are put in the middle of the Curvatures of the said *Abacus*, and is as Thick in the Front as the Breadth of the Horns thereof, and a little more: The *Ovolo* is as big as three Parts of five of the *Abacus*, and its lower Part begins right against the lower Part of the Eye of the *Voluta*: It hath in *Projection* $\frac{1}{4}$ Parts of its Height, and is with its *Projection* perpendicular to the Hollow of the *Abacus*, or a little more.

The *Fuse* is a third Part of the Height of the *Ovolo*, and hath in *Projection* something more than the half of its Thickness, and turns about the Capital under the *Voluta*, and is always seen. The *Gardetten* or Moulding, which goes under the *Fuse*, and makes the *Orlo* of the Bell of the Capital, is the half of the *Fuse*: The Body of the Bell answers direct with the Bottom of the Flutes of the Column; of this sort I have seen one at Rome, from which I have drawn the said Measures, because it appeared to me very beautiful, and well order'd.

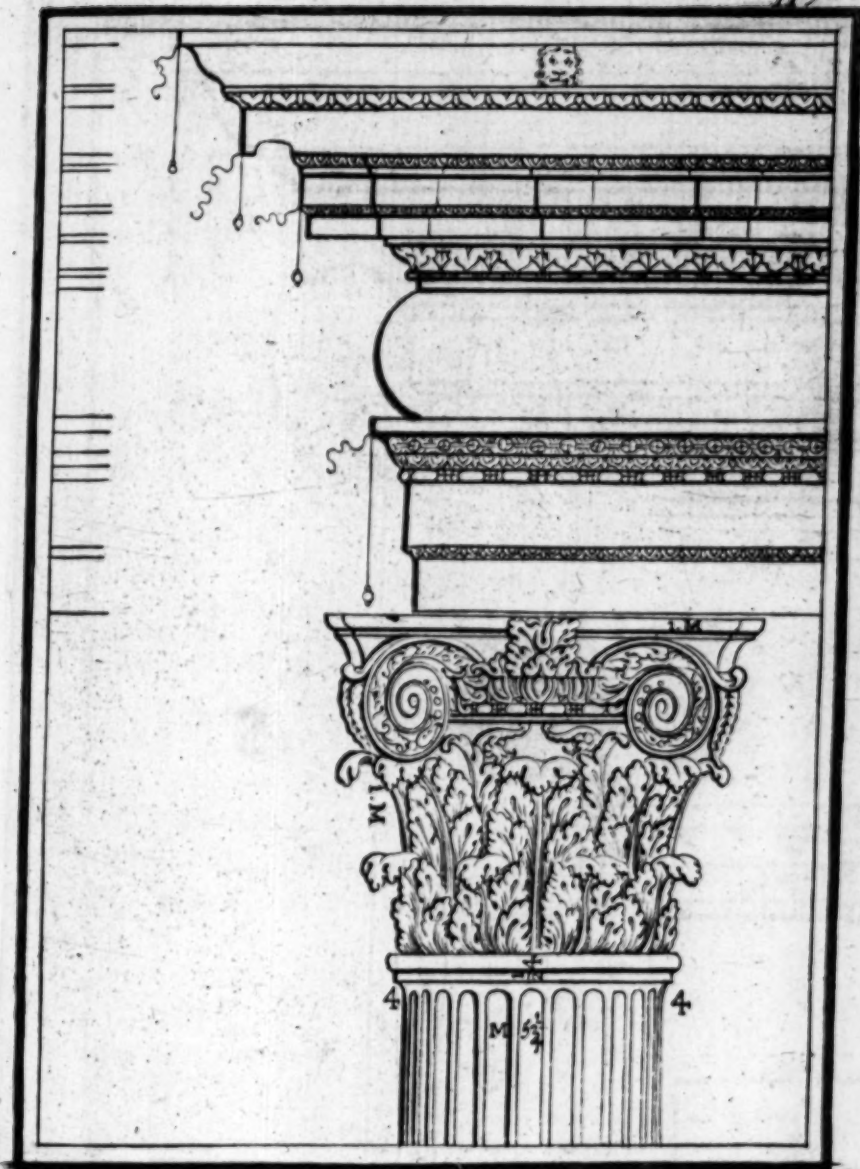
There are Capitals made after another Manner, which may be call'd *Composita*, of which shall be discoursed, and the Figures thereof shall be put in my *Books of Antiquities*.

The *Architrave*, *Frize*, and *Cornice* are the fifth Part of the Height of the Column; and their Compartments may be well known by that which hath been said before in the other Orders, and by the Numbers placed in the Design.



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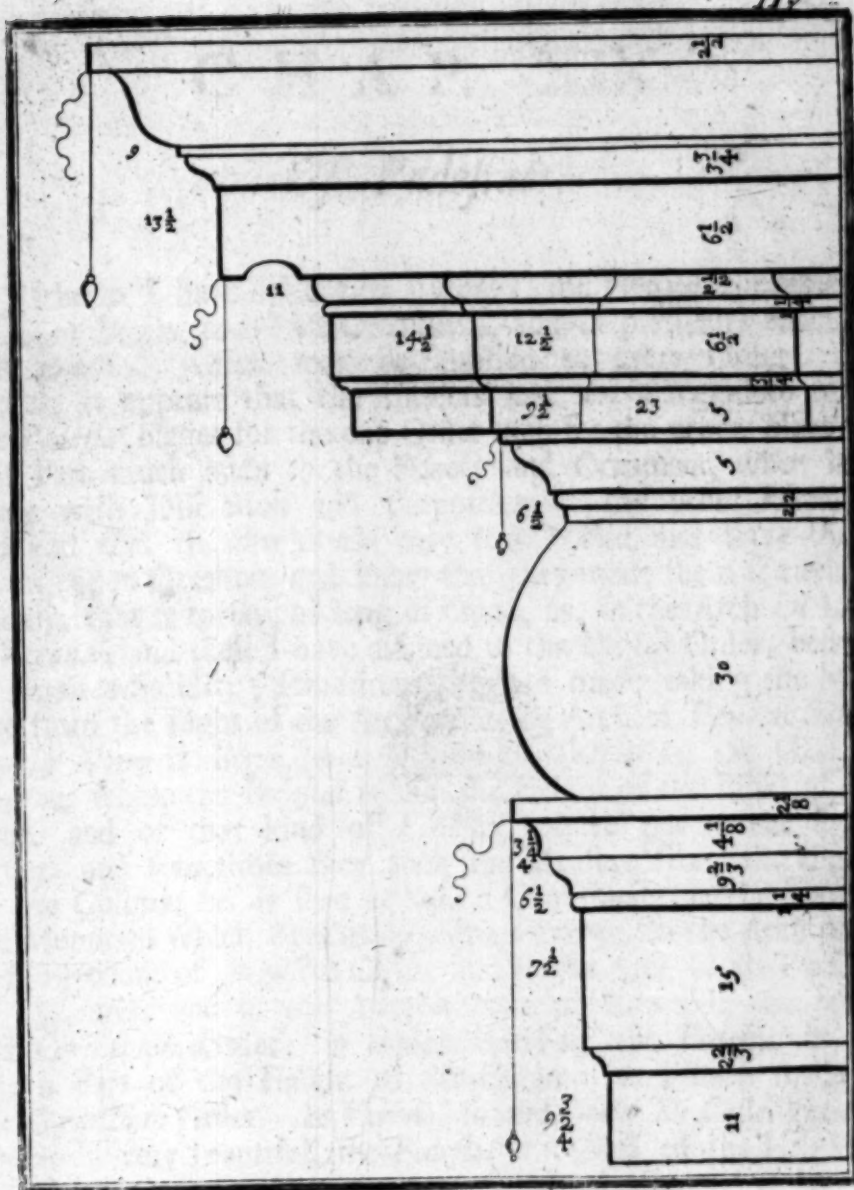




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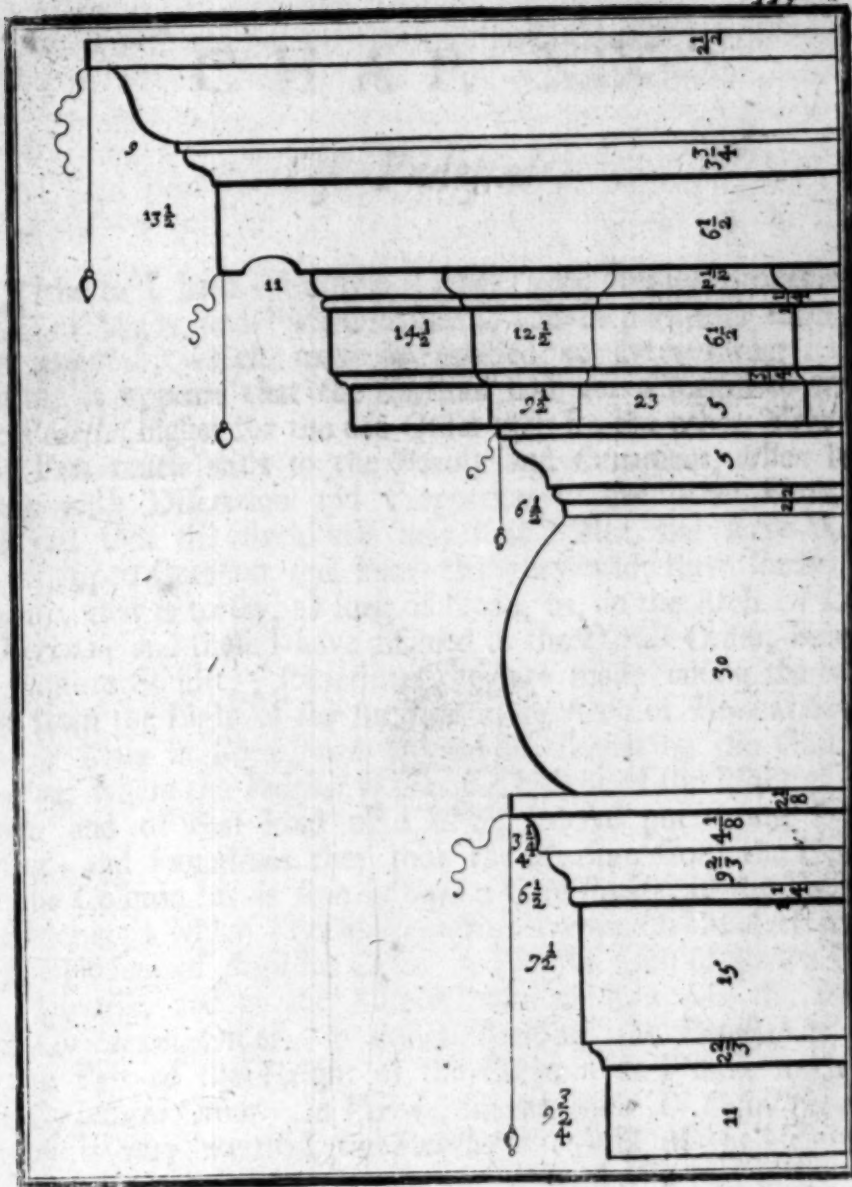
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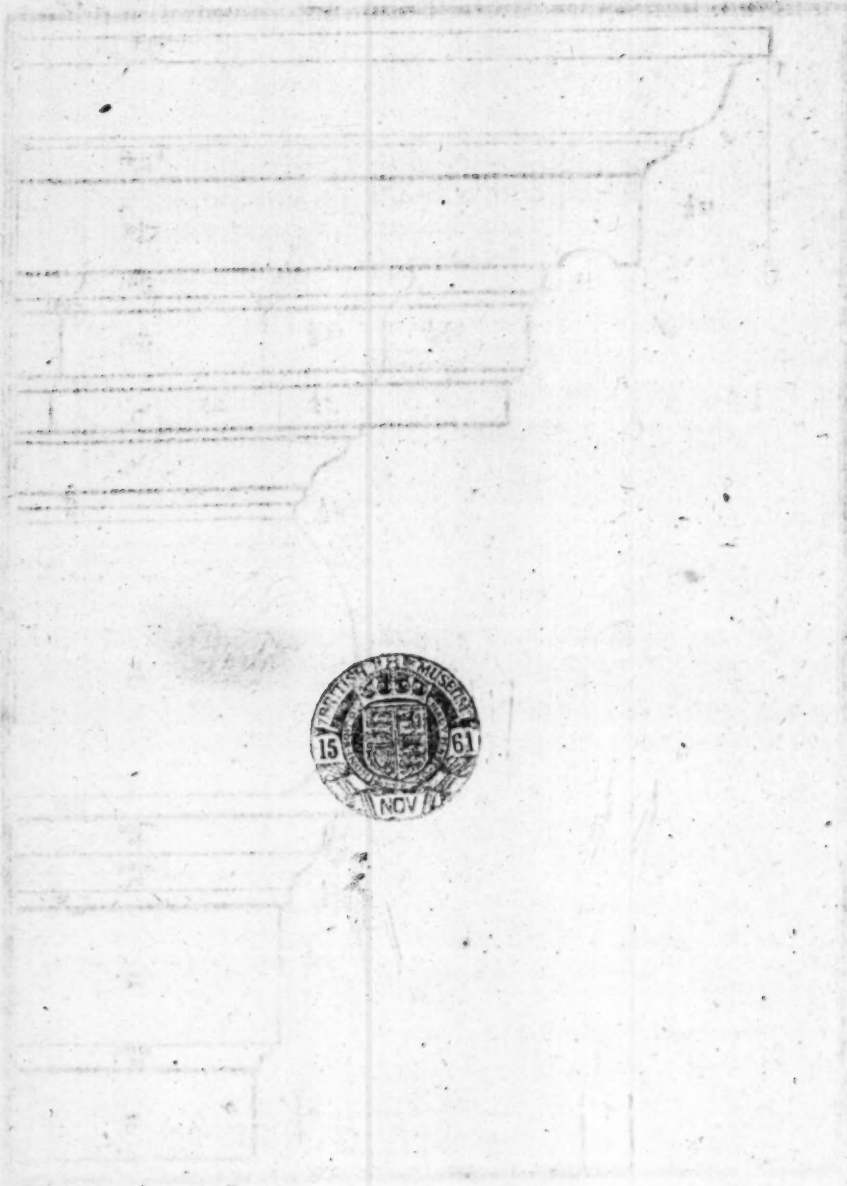


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C H A P. XIX.

Of Pedestals.

Hitherto I have discoursed (what to me seemed convenient) of Walls, and their Ornaments, and in particular touching the *Pedestals*, which may be applied to every Order: But because it appears that the Antients had not a regard to make the *Pedestal* bigger for the one Order than for the other, although this Part much adds to the Beauty and Ornament, when it is made with Discretion and Proportion to the other Parts, to the end that the Architects may take notice, and serve themselves, upon Occasion, and know that they made them sometimes Square, that is to say, as long as broad, as, in the Arch *Di Lioni* at *Verona*; and these I have assigned to the *Dorick* Order, because it requires Solidity; sometimes they are made taking the Measure from the Light of the Arch, as in the Arch of *Titus* at *Santa Maria Nova* in *Rome*, and in that of *Trajan* on the Gate of *Ancona*, where the *Pedestal* is half the Height of the Light of the Arch, and of that kind of *Pedestal* I have put to the *Ionick* Order; and sometimes they took the Measure from the Height of the Column, as is seen at *Susa* a City situate at the Foot of the Mountain which divides *Italy* from *France*, in the Arch made to the Honour of *Augustus Caesar*, and in the Arch of *Pola* a City of *Dalmatia*, and in the Amphitheatre of *Rome*, in the *Ionick* and *Corinthian* Order; in which Building the *Pedestal* is the fourth Part of the Height of the Column, as I have made in the *Corinthian* Order. In *Verona*, in the Arch *Di Castel Vecchio*, which is very beautiful, the *Pedestal* is a third of the Height of the Column, as I have put in the *Composita* Order; and these are the handsomest Forms of *Pedestals*, and have the best Proportion with their other Parts. And when *Vitruvius*, discoursing of Theatres, makes mention of the *Poggio*, you may know that the

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Poggio

Poggio is the same with the *Pedestal*, which is the third of the Length of the Column, put for Ornament of the Scene; but of *Pedestals*, which exceed a third of the Column, such are seen at *Rome* in the Arch of *Constantine*, where the *Pedestals* are two Parts and a half of the Height of the Column; and almost in all the ancient *Pedestals* the Bases are observ'd to have been made twice as big as the *Cymatium*, (as is seen in my Book of *Arches*.)

CHAP. XX.

Of Errors.

HAVING set down the Ornaments of the Architecture, that is to say, the five Orders, and shewn how they are made, and laid down the Profiles of each of their Parts, which I found that the Antients did observe; it seems to me not unfit here to acquaint the Reader of many Abuses, which being brought in by the Barbarous, are yet observed; to the end that the Studious in this Art may avoid them in their own Works, and understand them in others.

I say then, that *Architecture* (as all other Arts are) being Imitatrix of Nature, accounts nothing Tolerable, which is estranged and differs from that which is Natural: Wherefore we see that those Ancient Architects who built with Timber, when they began to build with Stone, directed that the Columns might be less at the Top than at the Foot; taking Example from Trees, which are less at the Top than in the Trunk, and near the Root. Likewise, because it is very convenient that those Things upon which any great Weight is put, should be pressed, under the Column they put a *Base*, which with their *Torus* and *Scotia* seem by the Burthen over them to be swelled; so also
in

in the *Cornices* they bring in the *Triglyphs*, *Modillions*, and the *Dentils*, which should represent the Heads of the Joists, which in the Ceiling are placed to bear up the Roof. The same may be observed in all other Parts, if you are Curious: And being so, you cannot but blame that Form of Building which deviates from that which Nature instructeth, and from that Simplicity which is directed in Things by her produced, framing (as it were) another Nature, and departs from the true, good, and handsome Manner of Buildings; for which reason you ought not (instead of Columns or *Pilasters*, which are to bear up some great Weight) to place *Cartouches*, which are certain Scroles, which to the Intelligent seem Deformed, and to the Ignorant, rather Confusion than Pleasure; nor do they produce other Effects than encrease the Charge of the Builders. Likewise you must not make any of those *Cartouches* come out of the *Cornice*; for it is requisite that all the Parts of the *Cornice* be made to some End, and to make appear what it would be if the Work were framed of Timber. And besides, being it is convenient that, to uphold a great Weight, something solid and fit to support that Weight be required, questionless those *Cartouches* are altogether superfluous, because it is impossible that any Timber whatever could really perform what these seem; for feigning it self to be soft and gentle, I know not by what Rule they put them under any thing heavy and hard. But that which (in my Opinion) imports much, is the Abuse in making Frontispieces of Doors, Windows, and Galleries divided in the Middle, because they were made to defend the Inhabitants from Rain; I know nothing more contrary to Natural Reason, than to divide and open that Part which the Antients, instructed by Necessity it self, did make Whole, and raised in the middle, to shew that it ought to serve to defend the Inhabitants of the House, and those that enter therein, from Rain, Snow, and Hail. And although Variety and Novelty should please all, yet we are not to go against the Precepts of Art, and that which Reason demonstrates; whence we see, that although the Antients did vary, yet they never departed from the general and necessary Rules of Art, (as may be seen in my Book of *Antiquities*.) Also concerning the

Projecture of the *Cornice* and other Ornaments, 'tis no small Abuse, in making them come too forward; because when they exceed that which according to Reason is fit for them, especially if they be in a close Place, they seem narrow and uncomely, and put Fear in those which stand underneath, threatening always to Fall; you ought as much to avoid making the *Cornice* disproportionable to the Column: putting great *Cornices* upon little Columns, or upon little Columns great *Cornices*, who doubts but that such a Building will seem very ill-favour'd? Besides, to make the Columns seem to be of several Parts, making Rings and Wreathings about them, as it were to hold them together, ought as much as may be to be avoided; because how much the more intire and strong the Columns appear, so much the more they perform the Design for which they are placed, which is to render the Work above secure and firm. Many other-like Abuses might be reckon'd up, as of some Members which in the *Cornices* are made disproportionable to the other; which, by what I have shewn before, and by that which is now said, may be easily known. It remains now, to come to the disposing of the Particular and Principal Parts of the Building,

C H A P. XXI.

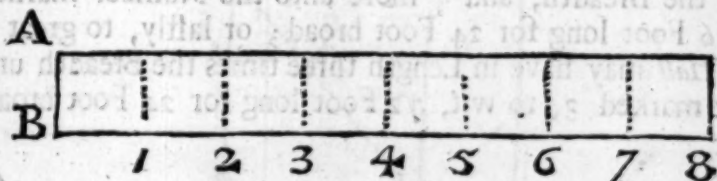
Of Galleries, Entries, Halls, Anti-Chambers and Chambers, and of their Proportions.

Galleries, for the most part, are wont to be made on the Wings and Sides, or on the Front; they serve for many Accommodations, as Walking, Eating, and other Divertisements, and they are made bigger or lesser, according to the Greatness and Conveniency of the Building; but ordinarily they ought not

not to have less than 16, 18, and 20 Foot in Breadth, and in great Buildings unto 24; and their Length at least five times their Breadth, six, seven, or eight at most.

Example.

Let A A represent a *Gallery*, the Breadth whereof is A B; you must give it in Length five times its Breadth unto the Number marked 5, or six times unto the Number 6, or seven times unto the Number 7, or lastly, eight times unto the Number 8, which is the greatest Length allowed to *Galleries*.



And besides, every House well composed, ought to have in the middle and chiefeft Part some Place to the which all the other Part of the House may relate and appertain; which Place vulgarly is call'd *Entry*, *Lobby*, or *Passage*, if it be below; and the *Hall*, if it be above, and is in the House as a Common Place; for it serves to entertain those who attend the Master's going forth, to salute him, and negotiate with him; and such Places are the first Part of the House that present themselves to those that would enter therein. The *Halls* serve for Feasts, Nuptials, and Banquets, to act Comedies, and to take other such-like Pleasures and Enjoyments; therefore it is that these Places ought to be greater than other, and of a capacious Form, to the End, that many Persons may commodiously be there entertained, and behold what is done.

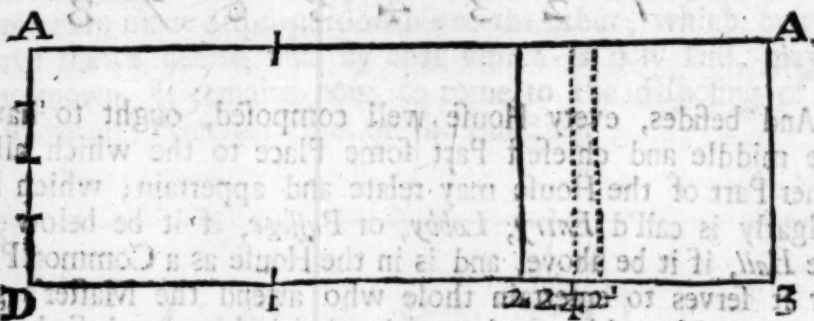
Of the Proportion which the Halls ought to have.

As for my part, I have not been accustomed to allow to the Length of *Halls* less than twice their Breadth, or twice and $\frac{1}{2}$ or $\frac{2}{3}$ Part

Part of the Breadth at most. And to great Buildings you may allow the Length to be three times the Breadth, whereupon they will be so much the more Beautiful and Convenient.

Example.

Let A A present a *Hall*, the Breadth whereof is A D, having 24 Foot; within the Work you may allow the Length twice the Breadth unto the Number marked 2; to wit 48 Foot in Length for 24 Foot in Breadth, or twice the Breadth, and $\frac{1}{2}$ more unto the Number marked $2\frac{1}{2}$, to wit, 54 Foot long for 24 Foot broad, or twice the Breadth, and $\frac{2}{3}$ more unto the Number marked $2\frac{2}{3}$, to wit 56 Foot long for 24 Foot broad; or lastly, to great Buildings the *Hall* may have in Length three times the Breadth unto the Number marked 3, to wit, 72 Foot long for 24 Foot broad.



The *Anti-Chambers* and *Chambers* ought to be so divided, that they fall on each Side of the *Entry*; and of the *Hall*; and you must take heed that those on the Right Hand may answer and be equal to those on the Left, to the end that the Building may be on one Side as on the other, and the Walls bear equally the Burden of the Roof.

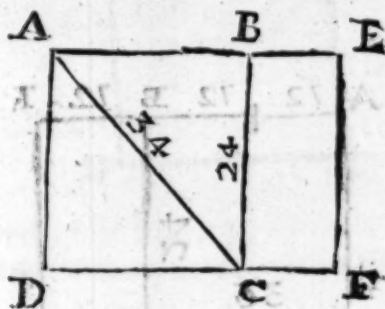
Of the Proportion of Anti-Chambers.

A well-proportion'd *Anti-Chamber* ought to have in Length the *Diagonal-Line* of the Square of the Breadth, or the Breadth and $\frac{1}{2}$ at most.

Example

Example of the first Bigness of Anti-Chambers.

Let ABCD be a Square, whereof each Side is 24 Foot; and the *Diagonal*-Line thereof being drawn AC, the same Length that the *Diagonal* is of, you must give to the said *Anti-Chamber* from A unto E, and from D unto E, in this Manner.



The *Anti Chamber* will have 34 Foot in Length to 24 Foot in Breadth.

Example

Example of the Second Bigness of Anti-Chamber.

Let ABCD be a Square, of which each Side is 24 Foot, as before, and to the said ABCD the half their Length, to wit, 12 Foot from B to F, and from C to G, you shall make the Anti-Chamber 36 Foot in Length to 24 Foot in Breadth.

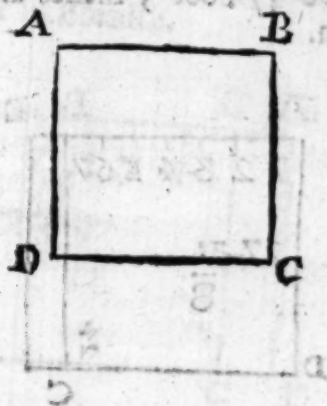
*Of the Proportion of Chambers.*

As for the *Chambers*, you may make therefore five Sorts and Proportions; for they are either Square, or they may be in Length their Breadth, with an eighth Part, a seventh, a sixth, or a fifth Part above their Breadth.

Example

Example of the First Bigness of Chambers.

Let ABCD be a perfect Square, of which the four Sides and the four Angles may be equal, this shall be the Bigness of the Chamber.



Example of the Second.



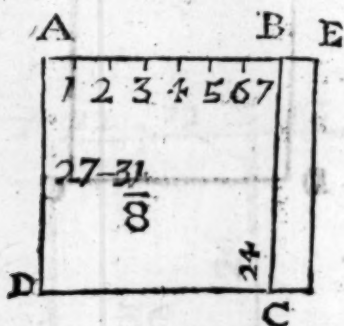
Let ABCD be a Square, whereof each Side is 24 Foot; you may divide one of the said Sides into eight equal Parts, whereof each may be three Foot; add one of the said Parts to the Side AB, and continue it to E, and as much to the Side DC continue to F, and you will make the Chamber 27 Foot Long, to the 24 Foot Broad.

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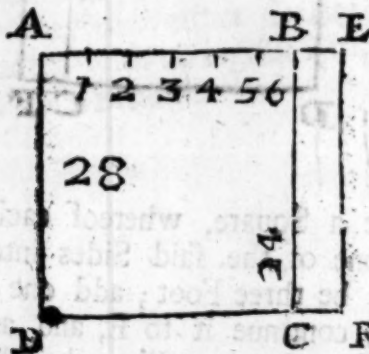
Example

Example of the Third.

Let ABCD be a Square, as before, of 24 Foot to each Side; divide the Side of AB into seven equal Parts; add to it one, continuing the same to E, and the Side DC unto F, the said Chamber will have 27 Foot 5 Inches and $\frac{1}{2}$ Part in Length, to 24 Foot in Breadth.

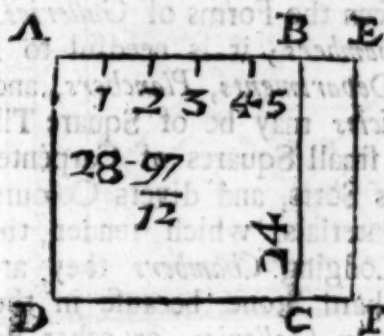
*Example of the Fourth.*

Let ABCD, as before, be a Square, having on each Side 24 Foot: Divide one of the Sides, as AB, into six equal Parts; add thereunto one of the said Parts, drawing the said Side unto E, and DC unto F, you will make the Chamber 28 Foot Long, to 24 Foot Broad.

*Example*

Example of the Fifth and last Bigness of Chambers.

Let the Figure ABCD be as before, each Side thereof to be 24 Foot: Divide one of the Sides into Five equal Parts; add one of the said Parts, drawing the Side AB unto E, and DC unto F, you will make the Chamber 28 Foot, 9 Inches, and $7\frac{1}{2}$ in Length, to 24 Foot in Breadth.



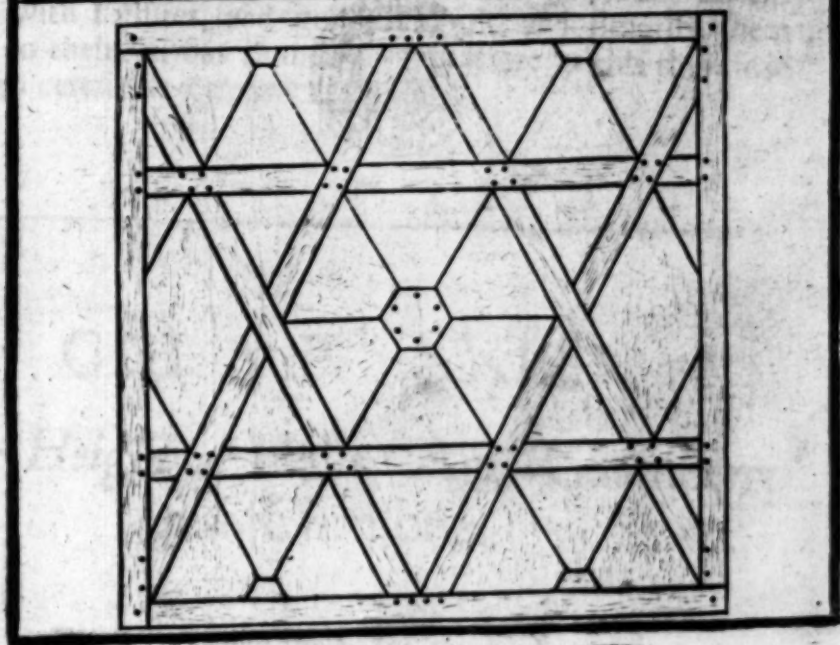
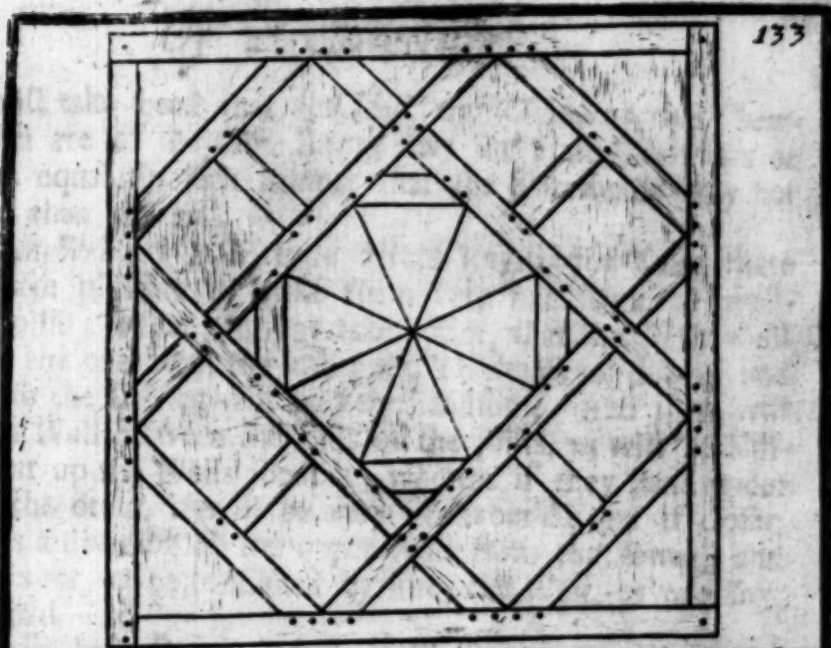
C H A P. XXII.

Of Floors and Superficies; of Departments, Planchers, and Flat Ceilings.

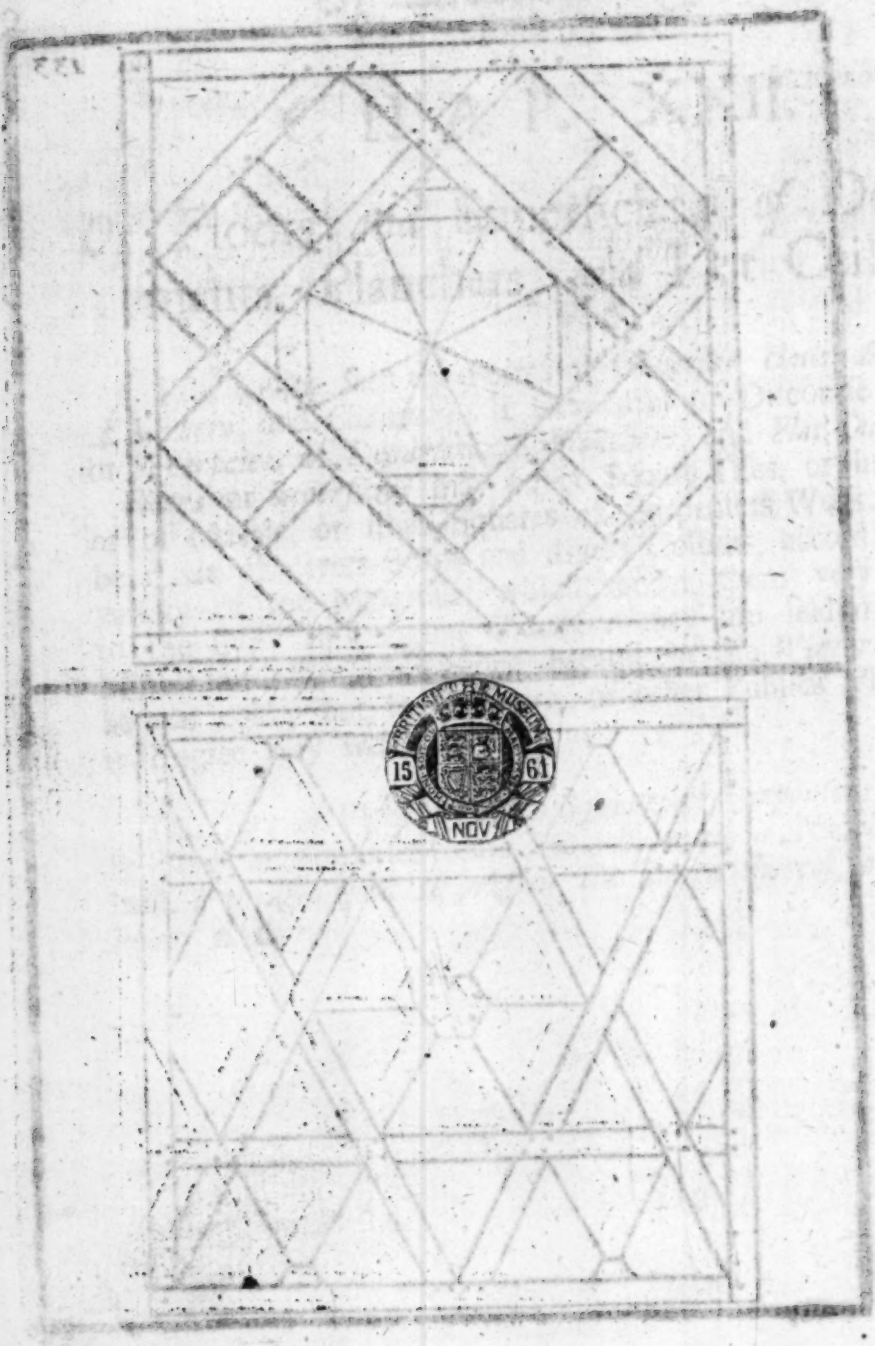
AFTER having seen the Forms of Galleries, Halls, Anti-Chambers, and Chambers; it is needful to Discourse of Floors or Superficies, of Departments, Planchers, and Flat Ceilings.

Floors or Superficies may be of Square Tiles, or hard Stone, or of Marble, or small Squares of Carpenters Work, and may be made of divers Sorts, and divers Colours, according to the variety of the Materials, which render them very agreeable to the Eye: In Lodging Chambers they are seldom made of Marble, or other hard Stone, because in the Winter they will be too cold; but in Galleries, or other Publick Places, they will agree very well.

This sort of Floors of small Squares of Carpenters Work may be seen at Somerset-House; which, being a Novelty in England, I thought good to present the Design thereof, although not in my Author.



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You must take heed that the *Hall, Anti-Chambers, and Chambers* which are of the same Story, may have all the Floors or Pavements equal, in such manner that the Thresholds may not be higher than the rest.

The *Planchers* are also made divers ways; for some there are that take pleasure to make them very handsome, of well-wrought Joists; where you may take notice, that the Joists must be distant the one from the other the Thickness of a Joist and half, and so the Ceiling will be very handsome: And there will be so much Wall between the Ends of the Joists, as will be sufficient to bear up the Walls about it; whereas if they stand wider one from the other, it will be very ill-favour'd; and if closer, 'twill be as a dividing of the upper Wall from the lower; and if the Joists rot, or be consumed by Fire, the Wall, of necessity, must be ruin'd.

Others will have Compartments of Plaister, or Wood, enriching them with Pictures, and gilded Work, and Beautify them according to their various Humours; wherefore in this there can be given no certain or determinate Rules.

C H A P. XXIII.

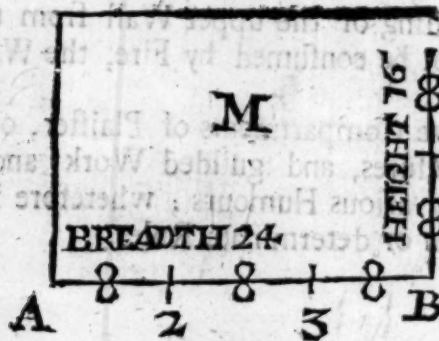
Of the Height of Halls, Anti-Chambers, and Chambers.

Halls, *Anti-Chambers, and Chambers* are made either Arched, or Flat: If you make them Flat, divide the Breadth into three Parts, and two of those Parts shall be the Height of the Story, from the Floor to the Joist.

Example.

Example of the First Height of Halls, Anti-Chambers, and Chambers.

Let the Figure M represent the Chamber whose Height you would find, which suppose to have in Breadth 24 Foot within the Work, which shall be divided upon the Line A B into three equal Parts, with Points, where is marked the Numbers 1, 2, 3 each Part being 8 Foot; two of each Parts shall be the Height of the Chamber, to wit, 16 Foot from the Floor to the Joist.

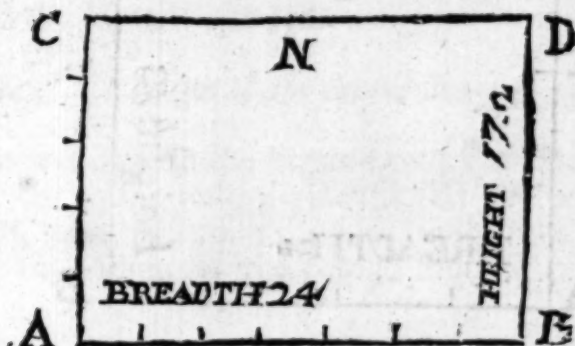


And if you would have it Higher, the Breadth must be divided into seven Parts; take thereof five, which will give the Height.

Example

Example of the Second Height.

Let the Figure N be of the same Breadth as the foregoing, to wit, 24 Foot within the Work, which shall be divided upon the Line A B into seven equal Parts; take thereof five to make the Height of the Story A C and B D, the said Height will be 17 Foot 2 Inches from the Floor unto the Joists.



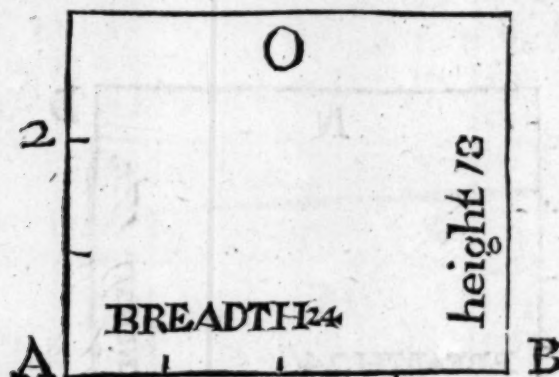
Or divide the said Height into four Parts, and three of those Parts will likewise give a greater Height.

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Example

Example of the Third Height, yet higher.

Let the Figure O be of the same Breadth as the former, to wit, of 24 Foot within the Work, which shall be divided upon the Line A B into four equal Parts, three whereof you must take for the Height of the Story, so it will be of 18 Foot from the Floor to the Joist.



CHAP. XXIV.

Of the Proportion of the Height of Chambers of the Second Story.

THE Height of *Chambers* of the Second Story shall be a Twelfth Part less than the *Chambers* below.

Example of the Height of the Second Story in the Figure marked M.

Be it, as it is said in the Figure marked M, its first Story 16 Foot from the Floor to the Joist, divide the said 16 Foot into Twelve

Twelve equal Parts, take Eleven, which will make 14 Foot 8 Inches for the Height of the Second Story from the Floor to the Joist.

Example of the Second Story of the Figure marked N.

Be it, as it is said in the Figure marked N, its First Story of 17 Foot 2 Inches High from the Floor to the Joist, divide the said 17 Foot 2 Inches into Twelve equal Parts, take thereof 11, which will make 15 Foot 7 Inches for the Height of the Second Story from the Floor to the Joist.

Example of the Height of the Second Story of the Figure O.

Be it, as it is said in the Figure O, its First Story of 18 Foot from the Floor to the Joist, divide the said 18 Foot into Twelve equal Parts, take thereof 11 which will make 16 Foot and a half for the Height of the Second Story from the Floor to the Joist.

C H A P. XXV.

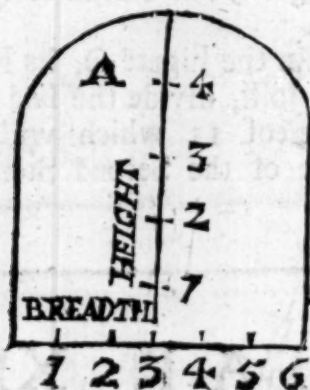
Of the Proportion of Halls; Anti-Chambers, and Chambers of the First Story, which are Arched.

IN great Buildings, the *Hall, Anti-Chambers,* and other Rooms of the First Story, may be Arched; whereupon they will be much more handsome, and less subject to Fire: Their Height is made by dividing the Breadth into six Parts; and thereof take five, which will give the Height that it ought to have from the Floor or Superficies, unto the Bottom of the Key of the Arch.

Of Architecture.

Example of the First Height of Halls, Anti-Chambers, and Chambers which are Arched.

Let the Figure marked A be of 24 Foot in Breadth, more or less, and be divided into six equal Parts; take thereof five which will make it 20 Foot high from the Floor unto the bottom of the Key of the Arch.



And if you would have one higher, you must divide the said Breadth into eight Parts, and seven thereof shall be the Height.

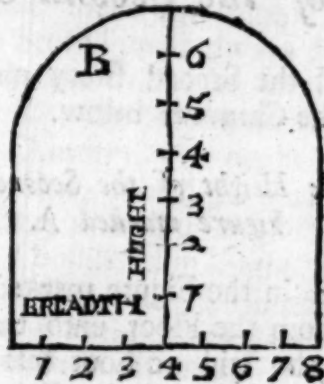
Example

Of Architecture.

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Example of the Second Height.

Let the Figure B, having the same Breadth as the former 24 Foot within the Work, be divided into eight equal Parts, and take thereof seven, which will make 21 Foot for the Height from the Floor unto the bottom of the Key of the Arch.



And if you divide the same Breadth into Twelve Parts, you must take thereof Eleven, which will make it higher.

Example of the Third, yet higher.

Let the Figure C be of 24 Foot broad within the Work, as the former, divide the 24 Foot into Twelve equal Parts, take thereof Eleven, which make 22 Foot in height from the Floor unto the bottom of the Key of the Arch.



CHAP.

C H A P. XXVI.

Of the Proportion of the Height of Chambers of the Second Story.

THE Chambers of the Second Story must be raised a sixth Part less than the Chambers below.

Example of the Height of the Second Story of the Figure marked A.

Be it, as it is said in the Figure marked A, its First Story of 20 Foot in Height, from the Floor unto the bottom of the Key of the Arch, divide the said 20 Foot into six equal Parts, take thereof five, which will make the Second Story 16 Foot 8 Inches from the Floor to the Joist.

Example of the Height of the Second Story of the Figure marked B.

Be it, as it is said in the Figure B, its First Story of 21 Foot in Height from the Floor unto the bottom of the Key of the Arch, divide the said 21 Foot into six equal Parts, take thereof five, which will make the Second Story 17 Foot 6 Inches in Height from the Floor unto the Joist.

Example of the Height of the Second Story of the Figure marked C.

Be it, as it is said in the Figure marked C, its First Story is of 22 Foot in Height from the Floor unto the bottom of the Key of the Arch, divide the said 22 Foot into six equal Parts, take thereof five, which will make the Second Story 18 Foot 4 Inches in Height from the Floor unto the bottom of the Key of the Arch.

C H A P.

C H A P. XXVII.

Of the Proportion of the Third Story.

IF you would make above the Second Story an Attique or Third Story, the Second must always be divided into twelve equal Parts, nine whereof will give the Height of the Third Story from the Floor unto the bottom of the Joist.

In the Building of *Chambers*, you ought to have regard as well to the Place of the Bed, which is usually six or seven Foot Square; and the Passage, as well as to the Situation of the Chimney, which for this Consideration ought not to be placed just in the middle, but distant from it about 2, or 2 Foot and a half, to the end it may make room for the Bed; and by this means the Inequality is little discerned, if it be not in Buildings the Breadth at least of 24 Foot within the Work, and in this Case it may be placed just in the Middle.

C H A P. XXVIII.

Of the Height of Galleries.

THE Lower Galleries must be as high as the *Halls*, *Anti-Chambers*, and *Chambers* of the First Story, to the end that one may enter therein on even Ground, which is to be understood then when the said Lower Galleries have the same Framing with the said *Halls*, *Anti-Chambers*, and *Chambers*, whose Floors ought ordinarily to be raised higher than the Ground-work of the Court about two Foot at least, or of three or four Foot, and is ascended by Steps, which ought not to have more than six Inches in Height, nor less than four, and in Breadth one Foot, or at the most 15 or 16 Inches.

But

But if the *Galleries* be made all open, so as they enter into it from the Court; in this case you may lay the Floor lower than the neighbouring Rooms, and 'twill suffice that the said Floor be one Foot higher than the Ground-work of the Court; thus doing, 'twill appear very graceful; for by this means they come near to the fair Proportion which they ought to have in their Height from the Floor or Superficies unto the bottom of the Key of the Arch, and their Entrance is by Steps which are between the opening of the Arches.

C H A P. XXIX.

Of the just Proportion which the Upper Galleries ought to have.

THE Upper Galleries are made either Flat or Arched; if Flat, they must be as high as broad: Galleries which are Arched must be as high as broad, with a fifth, fourth, or third Part over and above their said Breadth.

C H A P. XXX.

Of the Measures of Doors and Windows.

THE certain and determinate Measures cannot be given of the Height and Breadth of Principal *Gates* of Buildings: Not of *Doors* and *Windows* of *Chambers*; because, for to make the Principal *Gates*, the Architect must accommodate them to the Greatness of the Building, and the Quality of the Master, and the Use that is to be made of them; nevertheless, he will not omit to give the Measures following.

C H A P.

C H A P. XXXI.

Of the Proportion of Principal Gates.

PPrincipal *Gates* of Entrance, where Coaches and Waggon's ought to pass, and other such Necessaries, must not have less than seven and a half, eight, or nine Foot, and to great Buildings, unto ten or twelve Foot in Breadth.

Their Height must be their Breadth and half at least; and to have it well proportion'd, you must give it in Height twice their Breadth.

C H A P. XXXII.

Of the Proportion of Inner-Doors.

Doors within the House, in the least Building, ought not to have less than two Foot and a half in Breadth, and five Foot and a half in Height: Those from three to four Foot broad must have in Height twice their Breadth; and to great Buildings you may allow ev'n to five or six Foot in Breadth, and the Height double, and sometimes a fifth or fourth Part less than their Breadth.

The Antients were wont to make their *Doors* narrower above than below, as may be seen in a Church which is at *Trvoli*, (as *Vitruvius* teacheth;) and it is likely they did so, to give them more Force.

U

C H A P.

C H A P. XXXIII.

Of the Proportion of Windows.

THE Apertures of *Windows* must have 4 Foot and $\frac{2}{3}$, or 5 Foot, and to great Buildings unto 6; between the two Jaums their Height must be at least double their Breadth; and to make them comely and well-proportioned, a fourth Part, a third, or a half Part more than the Breadth: And according to the Bigness of these, you may make all the rest in the other Rooms of the same Story; but those of the Second Story ought to be lower by one twelfth Part than those of the First; and if you make *Windows* above them, you ought to make them a fourth Part lower than those in the Second.

C H A P. XXXIV.

Of the Proportion of Soils of Windows.

THE Soils of *Windows* must have 2 Foot 8 Inches, unto 3 Foot at most in Height. The *Transoms*, or Cross-pieces of *Windows*, must be 4 or 5 Inches Thick; their *Rebates* must be from 1 Inch and $\frac{1}{2}$ unto 2 Inches at most, to the end they may have greater Strength, and that the Frames of Wood which carry the Shutters may have convenient Strength. The Jaums of *Windows* must be much rebated and let-in from 2 Inches and $\frac{1}{2}$ to 3 Inches at least, to the end that the Wooden Frames may be strong, and join to the Wall; when the Wall is thin, the Shutters of the *Windows* ought to shut over the *Rebates* the half, or one third only; also it is needful to divide the said Shutters, that they may not be a hindrance to the Chamber, nor obscure the Light.

C H A P.

C H A P. XXXV.

Rules to be observed in making Doors and Windows.

IN making *Windows*, you are to take heed that you do not give them more or less Light than is necessary, nor make them wider or narrower than is needful; wherefore you ought to have regard to the Greatness of the Places which should receive the Light, it being evident that a great Room hath need of more Light than a little one: So that if the *Windows* be made less than they ought to be, the Place will be obscure and Dark. And because in Houses some *Chambers* are made large, some indifferent, some little, you must take great Care that all the *Windows* may be equal one with the other in their Rank, and Order, so that those on the Right Hand may answer those on the Left, and those above may be right over those below. Likewise the *Doors* must be right over one another, to the end that the Void may be upon the Void, and the Full upon the Full: moreover, let the *Doors* be placed in such manner, that one may see from one end of the House to the other, which is very graceful: And besides, 'tis cool in Summer, and hath many other Conveniencies.

It is very secure to turn *Arches* over *Doors* and *Windows*, which *Arches* do discharge and hinder that the *Doors* and *Windows* be not pressed with too much Weight, which is of great Importance for the Lastingness of Buildings.

The *Windows* must be conveniently distant from the Corners and Angles of the Building; because that Part ought not to be open and infeebled, whose office is to support and fasten all the rest of the Building.

C H A P. XXXVI.

Of the just Proportion which the Pilasters of Doors and Windows ought to have in Thickness and Projecture.

Pilasters of Doors and Windows ought not to be Thicker than the fifth Part of their Aperture, nor less than a sixth.

The Projecture of Pilasters in general, is found, by dividing their Thickness into six Parts, and one of those Parts must be the Projecture they ought to have.

It remains, to see their Ornaments.

C H A P. XXXVII.

Of the Ornaments of Doors and Windows.

HOW to adorn the Windows and Principal Doors in Buildings, may easily be known, from that which *Vitruvius* teacheth in the sixth Chapter of his fourth Book; adding thereunto all that the Most Reverend *Daniel Barbero* hath said thereon, and shewn in Design, and also of that which I have said before of all the Five Orders; therefore leaving that, I shall only put some Designs of the Ornaments of Doors and Windows of Chambers, so as they may be made divers Ways; and I shall mark.

mark particularly every Member which is graceful, and how much *Projeture* is needful.

The Ornaments which are given to *Doors* and *Windows*, are the *Architrave*, *Frize*, and *Cornice*.

The *Architrave* turns about the *Door*, and ought to be as Thick as the *Pilafter*, which (as I have said) ought not to be less than the sixth Part of the Aperture, nor more than a fifth; and from the *Architrave*, the *Frize* and *Cornice* take their Thickness, according to the two Inventions which follow.

Example.

Let the Breadth of the Aperture of the *Door* A A be divided into six equal Parts, one of these Parts shall be the *Architrave* B, which winds about the *Door*, and must be divided into four Parts; of three thereof is made the Height of the *Frize* C, and of five that of the *Cornice* D.

The

and particularly every Member which is essential and how much property is required.

The Quantity which is given to flow and to return, etc. the Division of water and ground.

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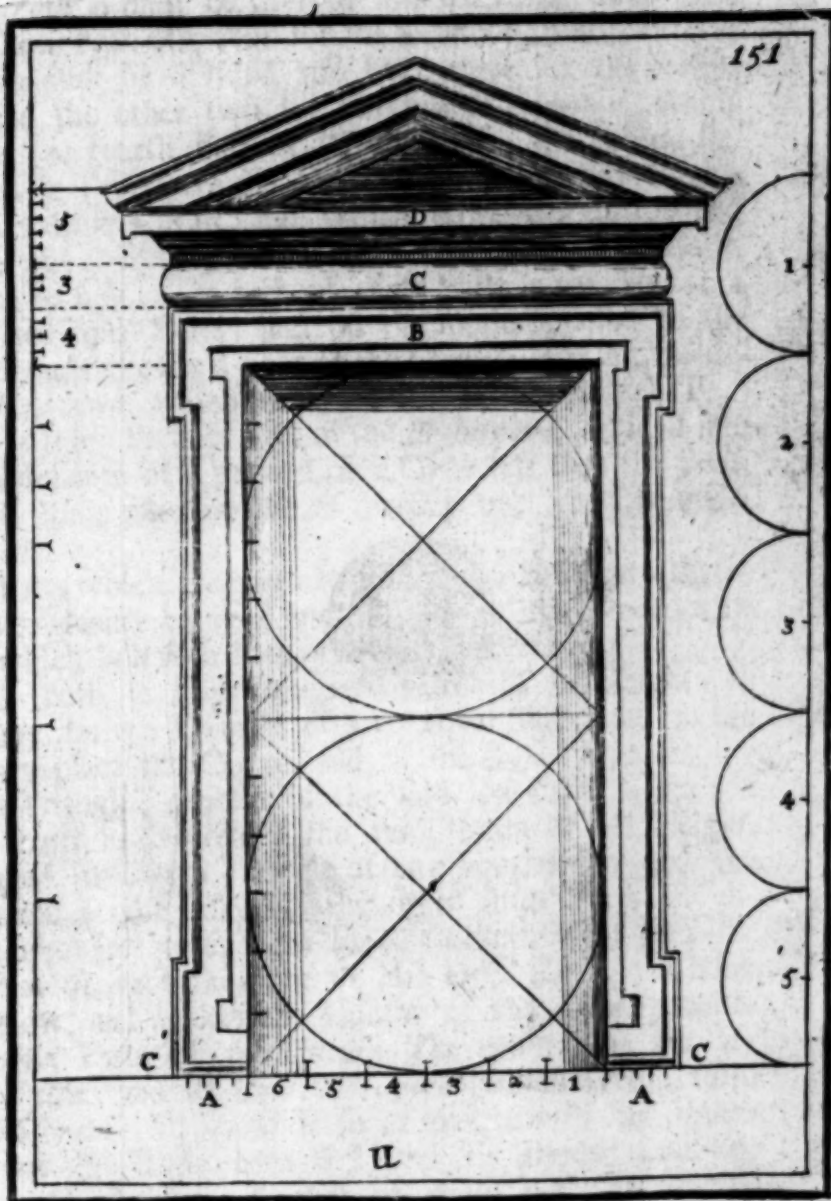
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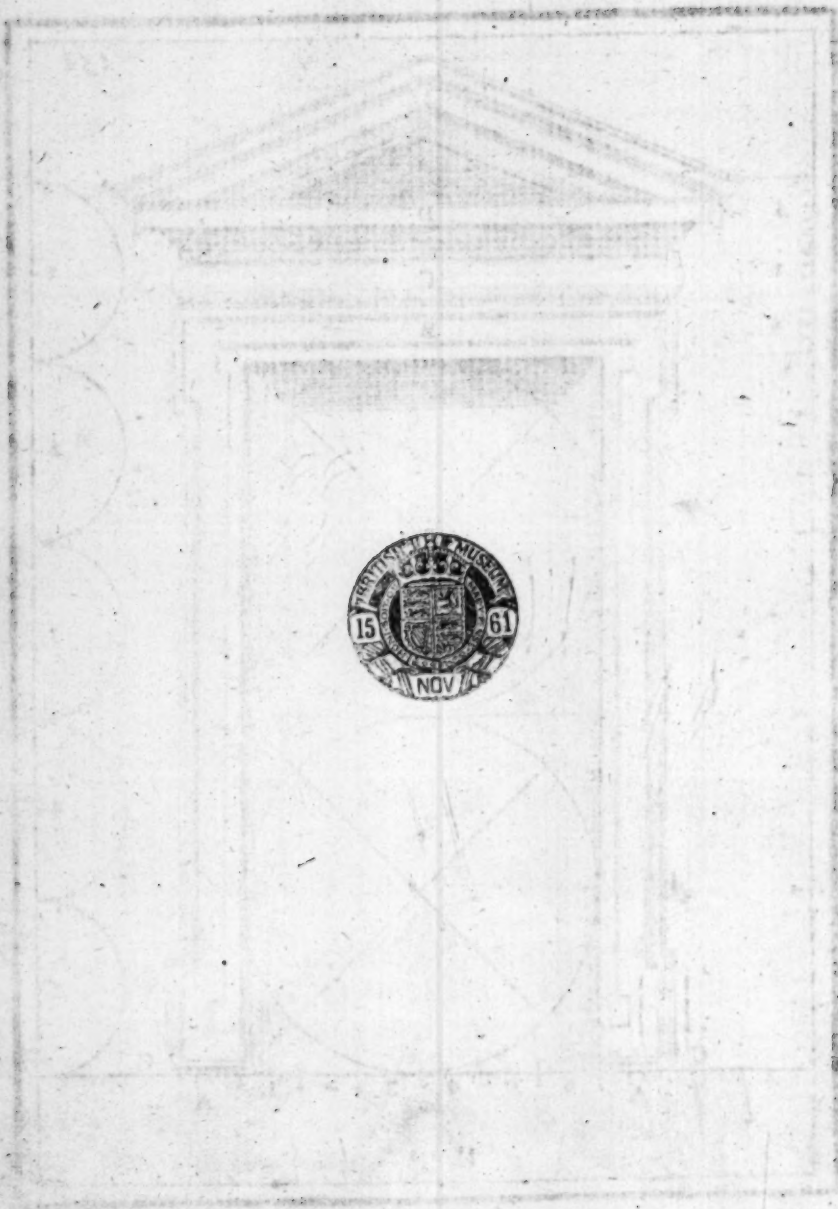
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The Measures of each Member of the Ornaments may be found in this Manner:

The *Architrave* B must be divided into ten Parts, three must be for the *Prima Fascia* G, four for the second V, and the three which remain must be divided into five; three for the *Schima Reversa* P, and the other two for the *Orlo* or *Regula* R, whose *Projecture* is the fourth Part of its Thickness; the *Schima Reversa* P hath in *Projecture* its Height, and is marked in this Manner; They draw a strait Line, which terminates at the end thereof under the *Orlo* or *Regula* R, and on the second *Fascia* V, and is divided in half, so as each of these Halles is the Base of a Triangle of two equal Sides; and on the Angle opposed to the Base must be plac'd the Fix'd Foot of the *Compass*; and the *Curve-Lines* must be drawn, which make the said *Schima Reversa* P.

The *Frieze* is three Parts of four of the *Architrave*, divided into four, and is designed of a portion of a *Circle* less than the *Semi-Circle*, the swelling whereof comes directly over the *Cymatium* of the *Architrave*.

The five Parts which are given to the *Cornice* distribute themselves in this Manner to its Members, one to the *Scocia* with its *Listella*, which is a fifth Part of the said *Scocia*.

The *Scocia* hath in *Projecture* two thirds of its Height; to design it, they form a Triangle of two equal Sides, and to the Angle G they place the Centre, and so the *Scocia* becomes the Base of the Triangle; another of the said five Parts is for the *Ovolo*, and hath in *Projecture* the two thirds of its Height, and is designed making a Triangle of two equal Sides, and the Centre is made at the Point H; the other three Parts are divided again into seventeen, eight for the *Corona* with its *Lists*, of which that above makes one of the eight Parts; and that which is below, and makes the Hollow of the *Corona*, makes one of the six Parts of the *Ovolo*: The other nine are for the *Schima Recta*, and its *Orlo* or *Regula*, which is the third of the said *Schima*. To frame it so as may be well and graceful, they draw the Right Line AB, and 'tis divided into two equal Parts: At the Point C one of those Parts is divided into seven, whereof six are taken at the Point D; then they form two Triangles, AEC, and CBF, and on the

Points E and F they put the Fix'd Foot of the Compass, and draw the portions of the Circles AC and CB, which make the said *Schima*.

The *Architrave* likewise in the second Invention, is divided into four Parts; of three is made the Height of the *Frize*, of five that of the *Cornice*; then the *Architrave* is divided into three Parts, two of them are divided again into seven; of which seven, three are the first *Fascia*, and four for the second; and the third Part of the *Architrave* is divided again into nine Parts; of two is made the *Astragal*; the other seven are divided into five Parts; three are the *Schima Reversa*, and two the *Orlo* or *Regula*.

The Height of the *Cornice* is divided into five Parts and $\frac{2}{5}$; one of which is divided again into six Parts; of five is made the *Schima Reversa* above the *Frize*, and of the sixth the *Listella*; the *Schima Reversa* hath as much *Projecture* as it is High, and the same also hath the *Listella*; the second Part of the Height of the *Cornice* is for the *Ovolo*, which hath in *Projecture* $\frac{2}{3}$ of its Height. The Moulding above the *Ovolo* is the sixth Part of the *Ovolo*, and hath the same *Projecture*; the other three Parts of the Height of the said *Cornice* are divided into seventeen Parts, eight of which are for the *Corona*, which hath in *Projecture* three Parts of four of its Height; the other nine are divided into four Parts, three are for the *Cimatium*, and one for the *Orlo* or *Listella*; the $\frac{2}{5}$ which remain are divided into five Parts and $\frac{1}{5}$; of one is made the Moulding, and of four $\frac{4}{5}$ the *Schima Reversa* above the *Corona*: The said *Cornice* hath as much *Projecture* as it hath Thickness.

Members

which that above makes one of the eight Parts; and that which is below, and makes the Hollow of the *Corona*, makes one of the six Parts of the *Ovolo*: The other nine are for the *Schima Reversa*, and its *Orlo* or *Regula*, which is the third Part of the said *Schima*. To summe it is to be well and grace-fully drawn the Right Line AB, and its divided into two equal Parts: At the Point C one of those Parts is divided into seven, whereof six are taken at the Point D; then they form two Triangles, AEC, and CBE, and on the Points

X

Members of the Council of the City of London.

I. Secre.

R. Quor.

L. Cleric.

N. Quor.

O. Orlo, or Regula.

Members of the University.

G. Prima Facie.

V. Secunda Facie.

P. Tertia Facie.

R. Orlo, or Regula.

S. Secrecy of the Place.

T. Test of the Place which enters the City Wall.

By the Means of these Two you may know the Members of the second Institution.

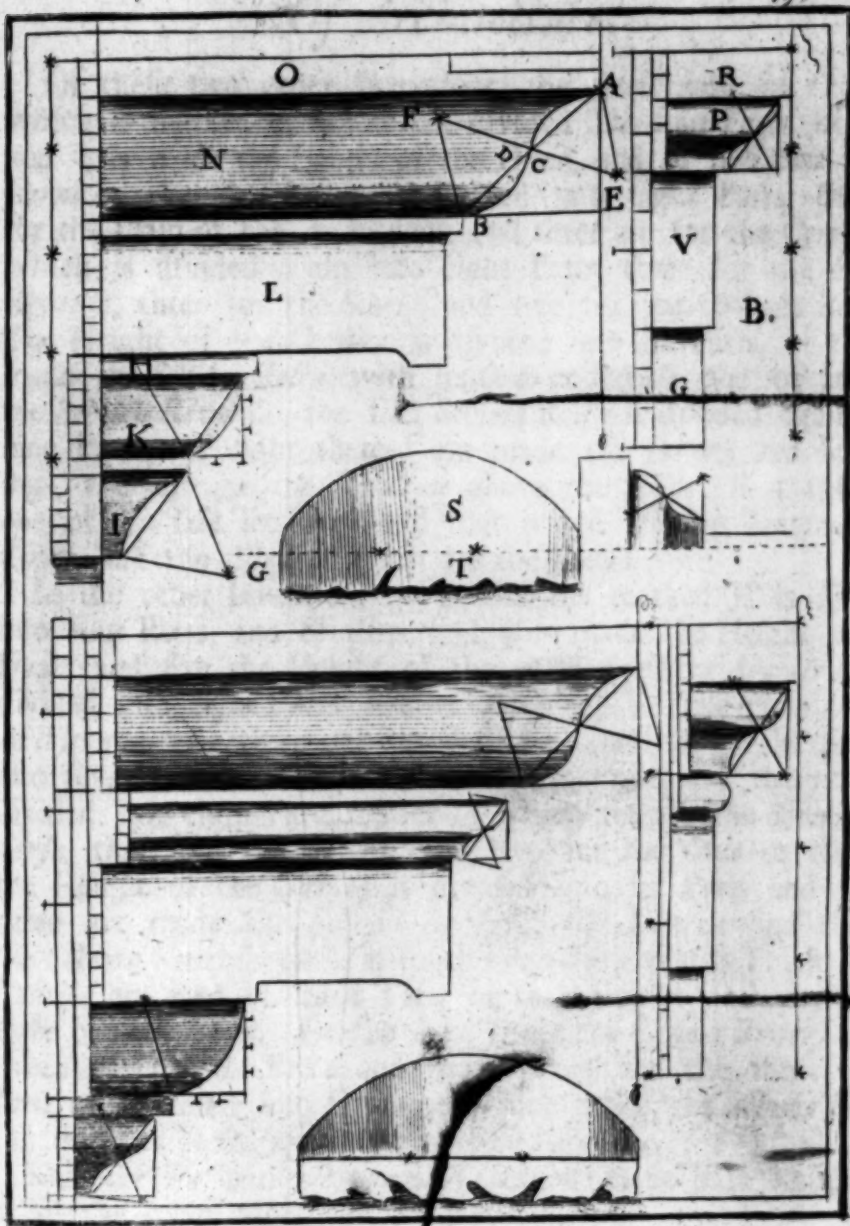
Members of the Cornice of the first Invention.

- I *Scocia.*
- K *Ovola.*
- L *Corona.*
- N *Cymatium.*
- O *Orlo, or Regula.*

Members of the Architrave.

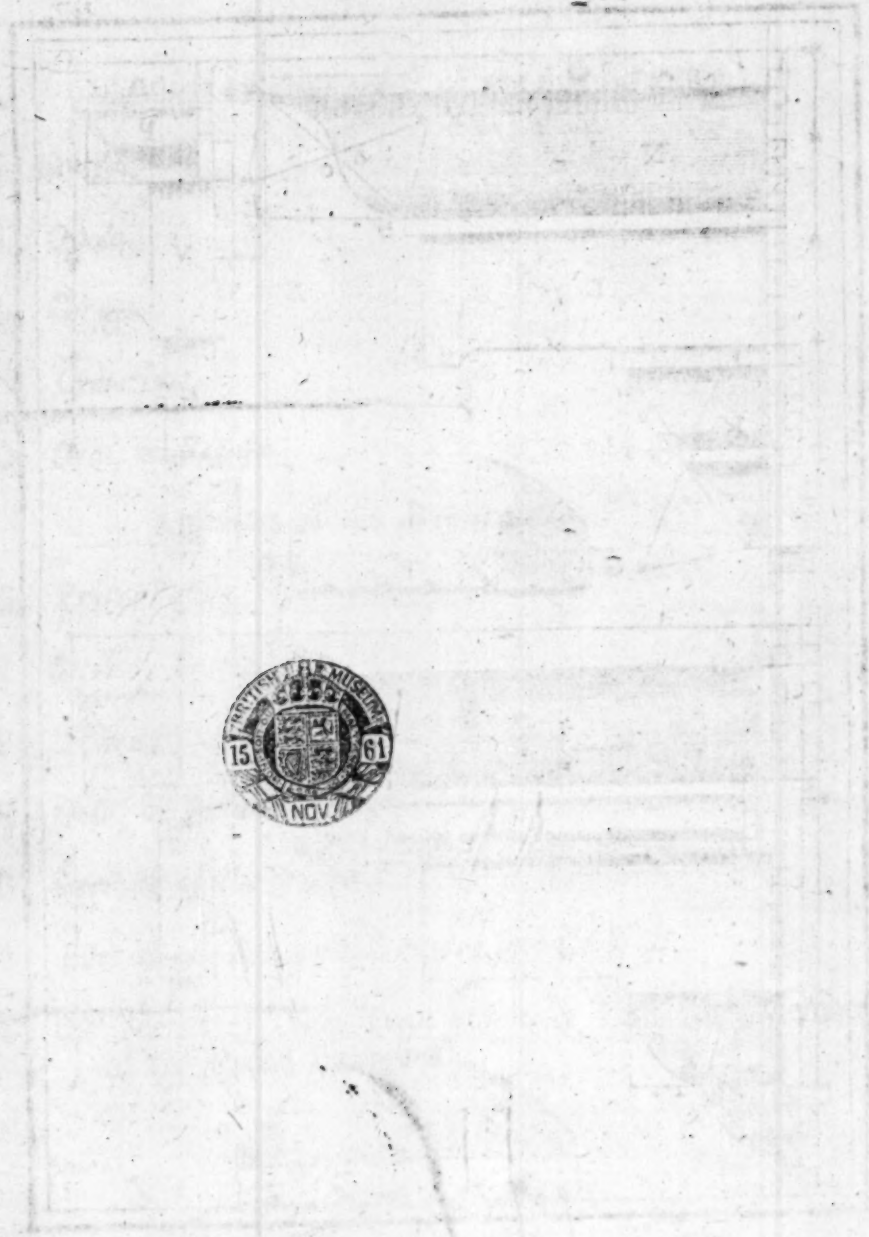
- G *Prima Fascia.*
- V *Secunda Fascia.*
- P *Schima Reversa.*
- R *Orlo, or Regula.*
- S *Swelling of the Frize.*
- T *Part of the Frize which enters into the Wall.*

By the Means of these Two, you may know the Members
of the second Invention.



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Of Architecture



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Of these two other Inventions, the *Architrave* of the first, which is marked F, is likewise divided into four Parts, of three and $\frac{1}{2}$ is made the Height of the *Frize*, and of five that of the *Cornice*; the *Architrave* is divided into eight Parts, five are for the Plain of the *Architrave*, and three are for the *Cymatium*, which is divided again into eight Parts, three for the *Schima Reversa*, three for the *Scocia*, and two for the *Orlo* or *Regula*: The Height of the *Cornice* is divided into six Parts, of two is made the *Schima Recta*, with its *Orlo* or *Regula*, and of another the *Schima Reversa*; the said *Schima Recta* is divided again into nine Parts, of eight thereof are made the *Corona* and Moulding; the *Astragal*, or *Rondeau* above the *Frize*, is a third of one of the said six Parts, and that which remains between the *Corona* and the *Astragal* is left for the *Scocia*.

In the other Invention, the *Architrave* marked H is divided into four Parts, and of three and $\frac{1}{2}$ is made the Height of the *Frize*, and five the Height of the *Cornice*: The *Architrave* is divided into eight Parts, five of them are for the Plain of the *Architrave*, and three are for the *Cymatium*, which is divided into seven Parts; of one is made the *Astragal*, and the rest are divided into eight Parts; three of which are for the *Schima Reversa*, three for the *Scocia*, and two for the *Orlo* or *Regula*; the Height of the *Cornice* is divided into six Parts and $\frac{3}{4}$, of three are made the *Schima Reversa*, the *Dentils* and *Ovolo*; the *Schima Reversa* hath as much *Projecture* as it is Thick: The *Dentils* are two of three Parts of their Height, and the *Ovolo* three of four Parts. Of the $\frac{3}{4}$ is made the *Schima Reversa*, between the *Schima Recta* and the *Corona*; and the three other Parts are divided into seventeen; nine make the *Schima Recta*, and the *Orlo* or *Regula*, and eight the *Corona*.

This *Cornice* hath as much *Projecture* as it hath Thickness, as all the other aforesaid.

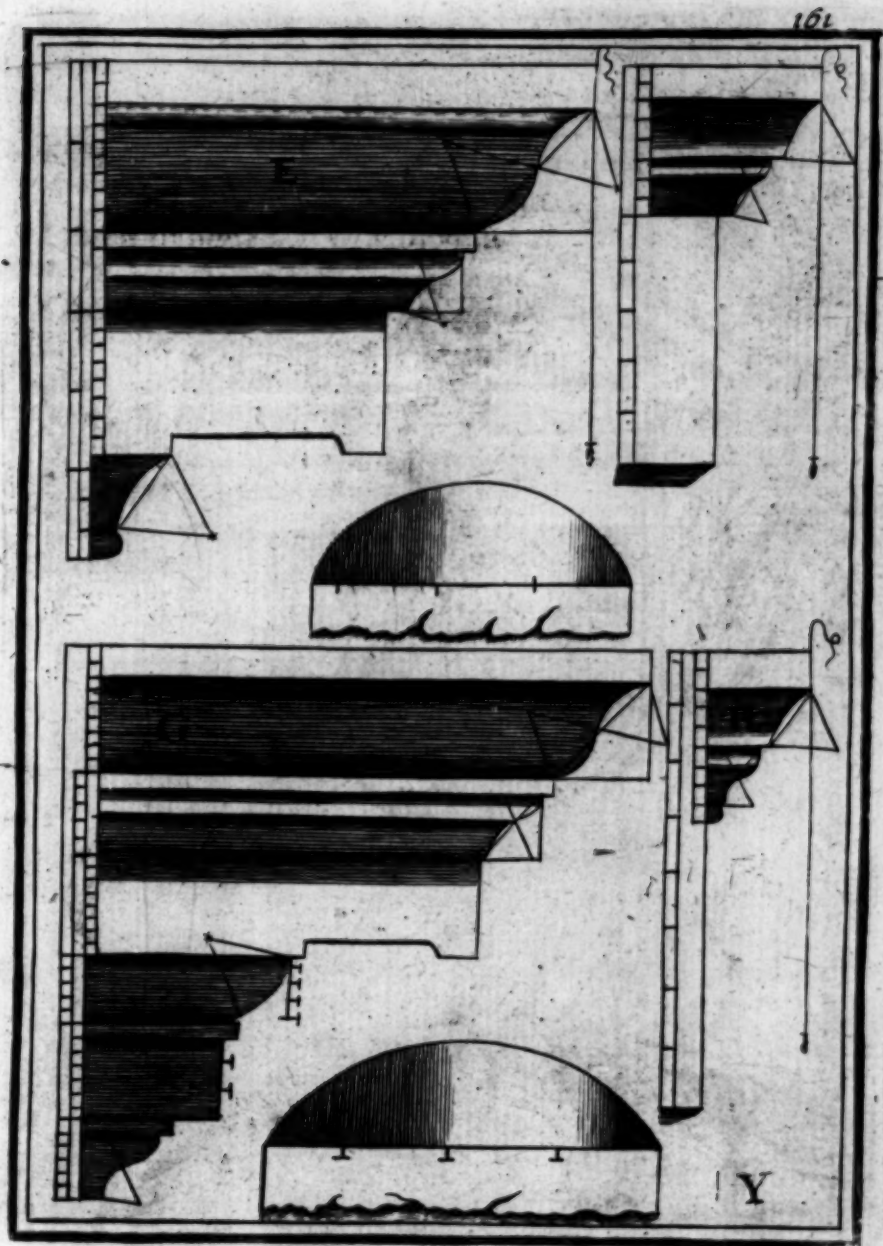
☞ Here follow Designs of Doors and Windows, according to the five Orders of Andrea Palladio, and are the same which are in the Louvre in Paris.

Of these two other Inventions, the Architrave of the full which is marked F, is likewise divided into four Parts, of three and $\frac{1}{2}$ is made the Height of the Frieze, and of five that of the Cornice; the Architrave is divided into eight Parts, five are for the Plain of the Architrave, and three are for the Cornice, which is divided again into eight Parts, three for the Schiva Reverse, three for the Scotia, and two for the Orie or Regula. The Height of the Cornice is divided into six Parts, of two is made the Schiva Reverse, with its Orie or Regula, and of another the Schiva Reverse; the said Schiva Reverse is divided again into nine Parts, of eight thereof are made the Cornice and Moulding; the Height of the Reverse above the Frieze, is a third of one of the said six Parts, and that which remains between the Cornice and the Architrave is left for the Scotia.

In the other Invention, the Architrave marked H is divided into four Parts, and of three and $\frac{1}{2}$ is made the Height of the Frieze, and five the Height of the Cornice. The Architrave is divided into eight Parts, five of them are for the Plain of the Architrave, and three are for the Cornice, which is divided into seven Parts; of one is made the Architrave, and the rest are divided into eight Parts; three of which are for the Schiva Reverse, three for the Scotia, and two for the Orie or Regula. The Height of the Cornice is divided into six Parts and $\frac{1}{2}$, of three are made the Schiva Reverse, the Scotia and Orie; the Schiva Reverse hath as much Projection as it is Thick: The Scotia are two of three Parts of their Height, and the Orie three of four Parts. Of the $\frac{1}{2}$ is made the Schiva Reverse between the Schiva Reverse and the Cornice; and the three other Parts are divided into seventeen; nine make the Schiva Reverse, and the Orie or Regula, and eight the Cornice.

This Cornice hath as much Projection as it hath Thickness, as all the other aforesaid.

It here follows Orders of Doors and Windows, according to the five Orders of Antiques, Palladio, and are the same which are in the Books in Parts.



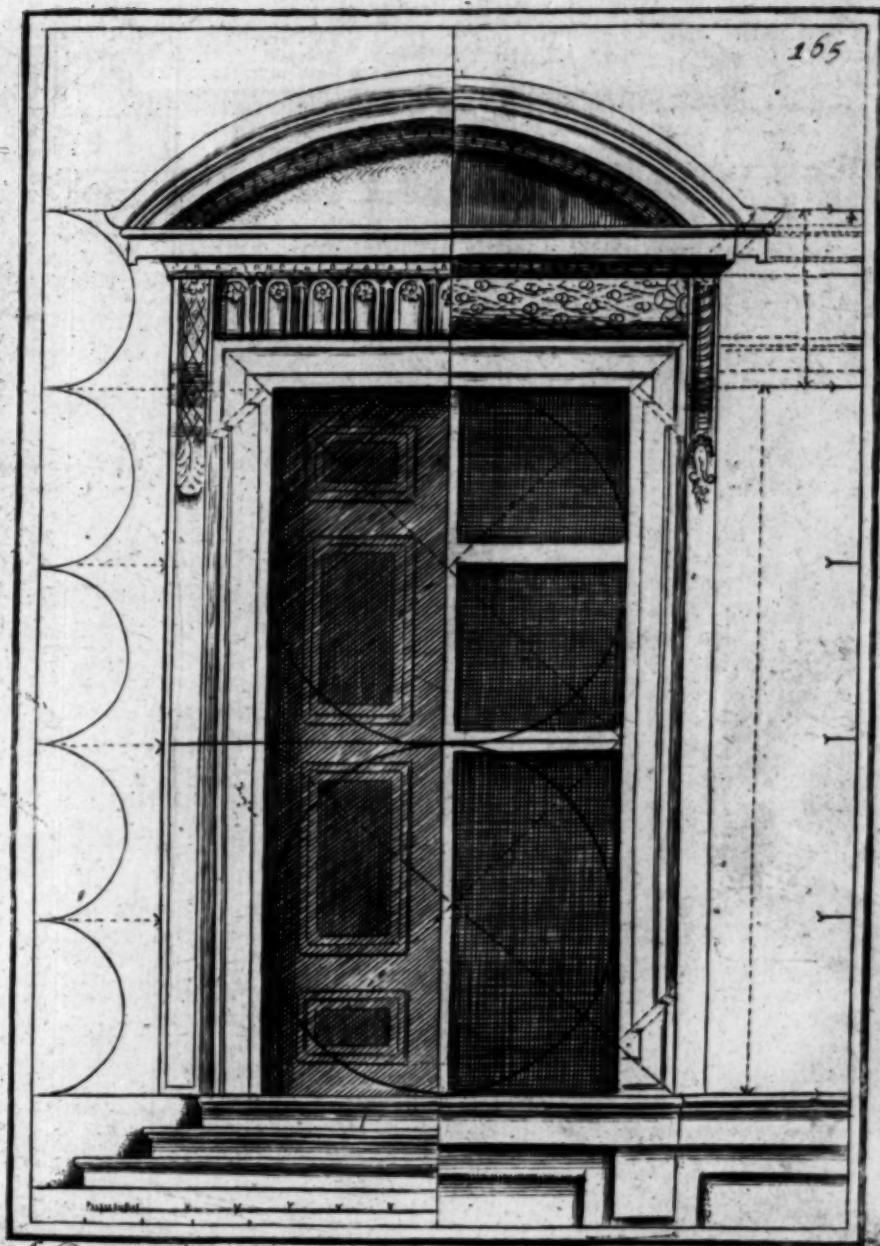
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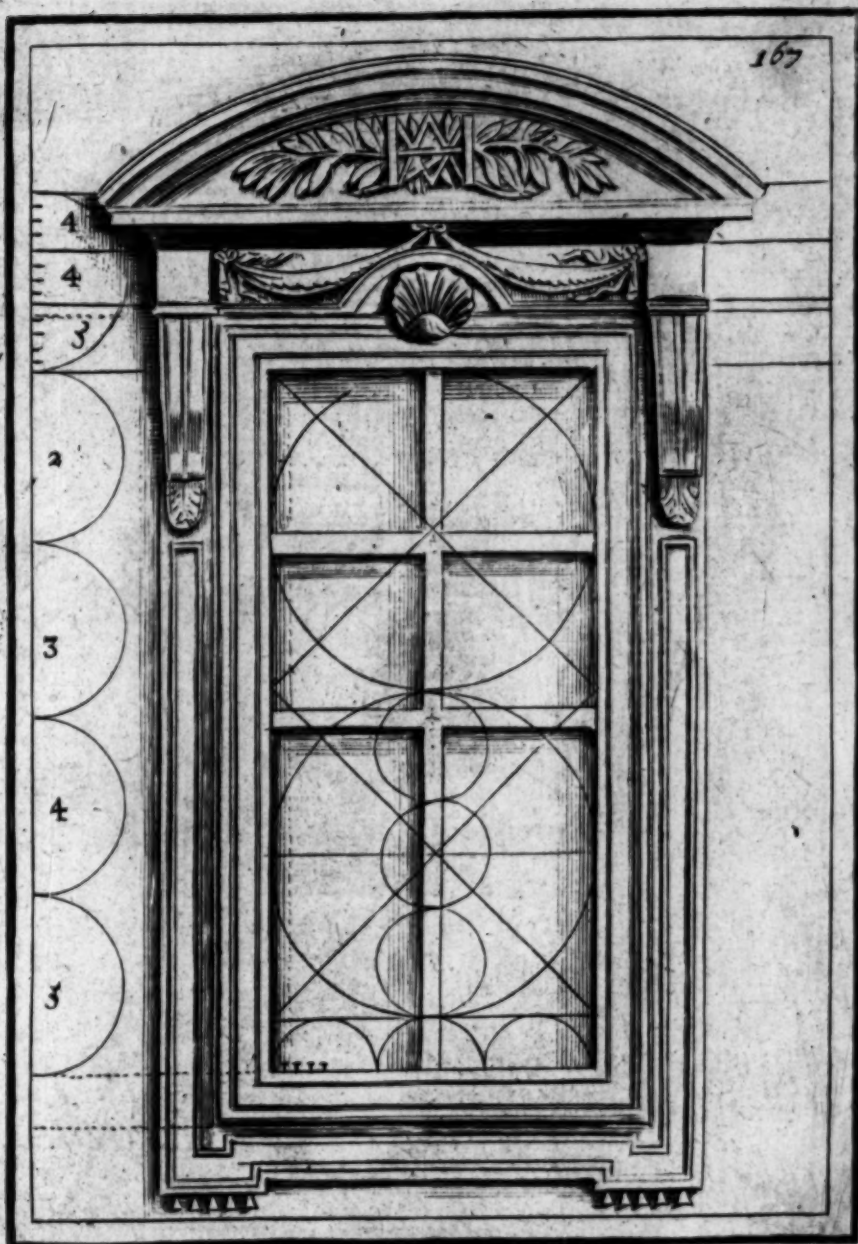




A Doore and windowe according to the Tuscan Order

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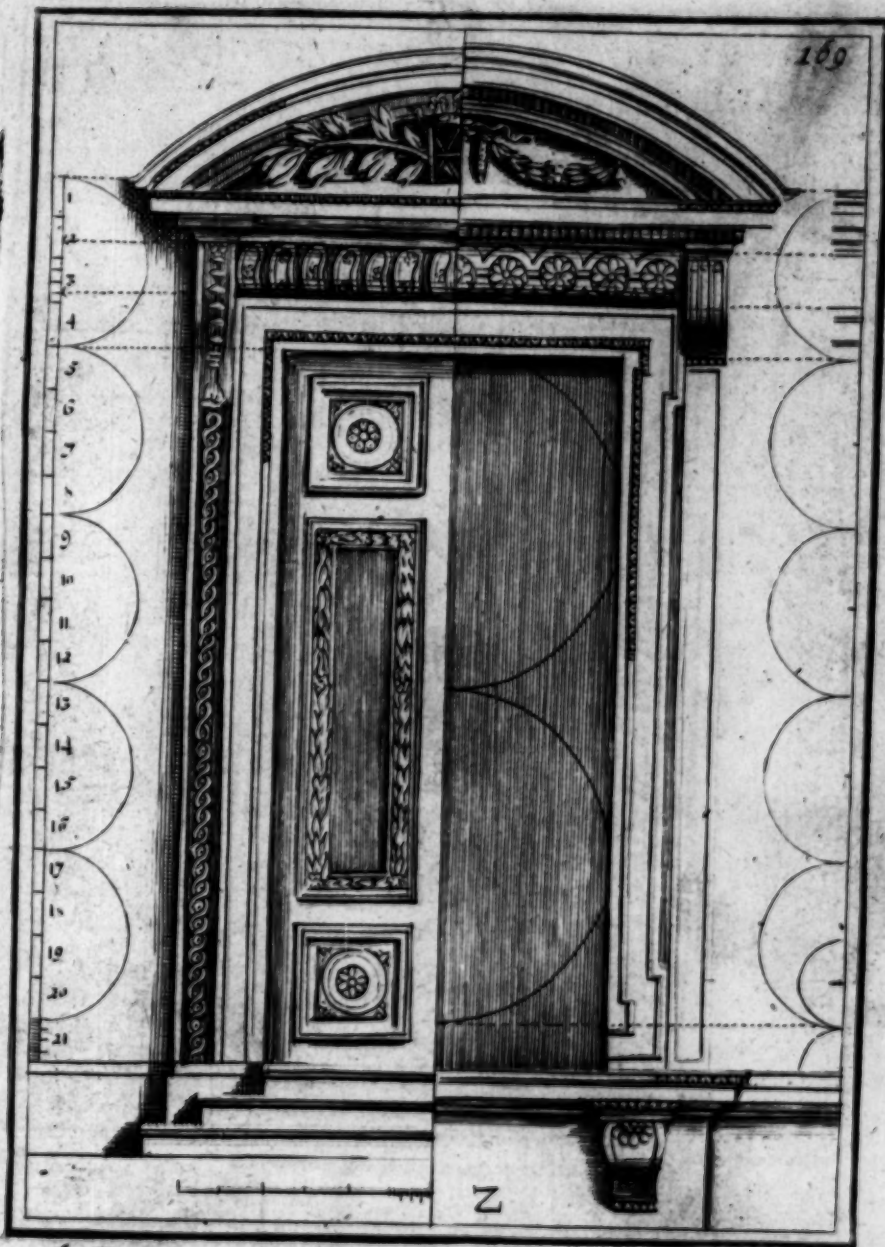




A Door and window according to the Dorick Order

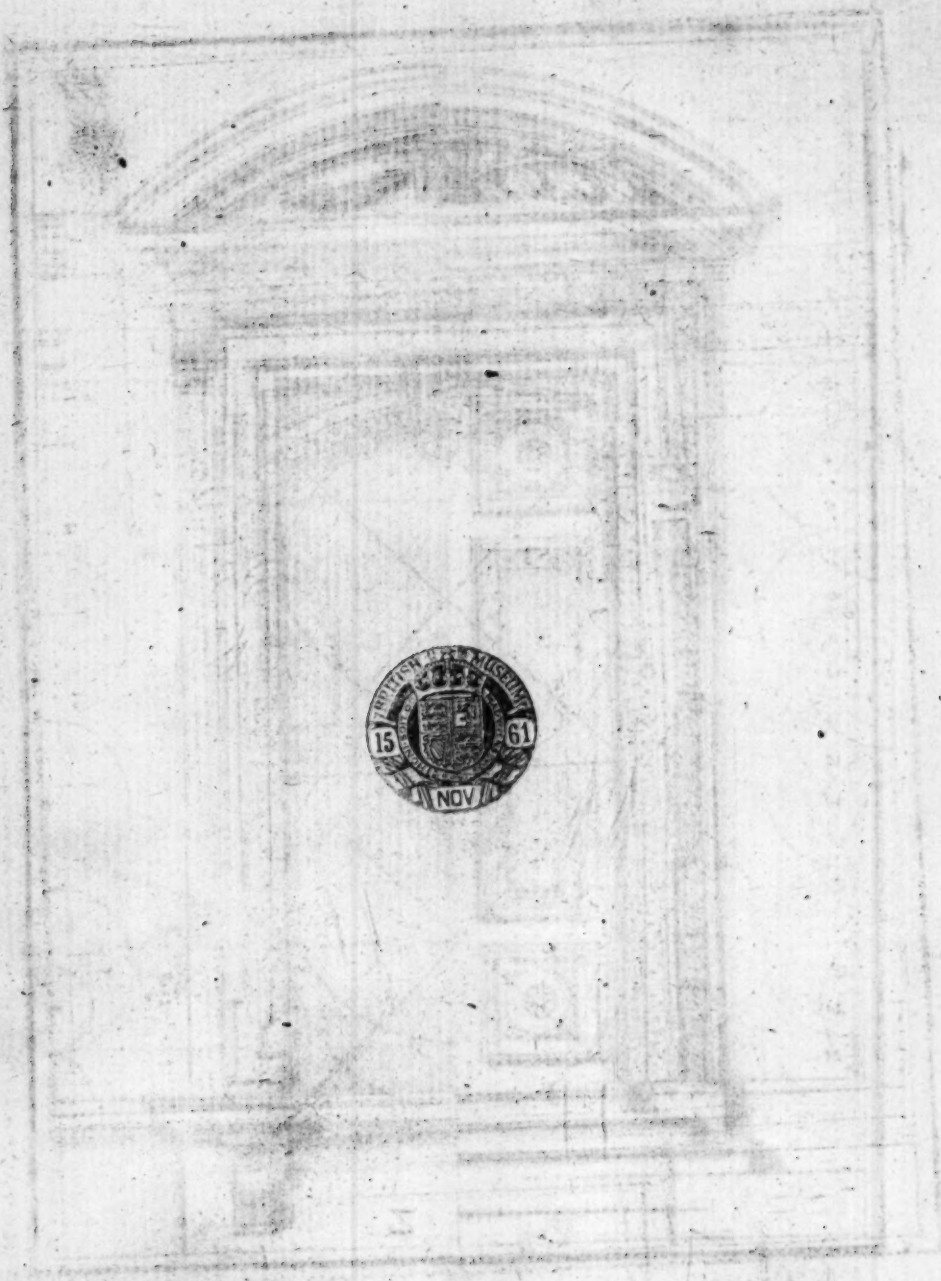
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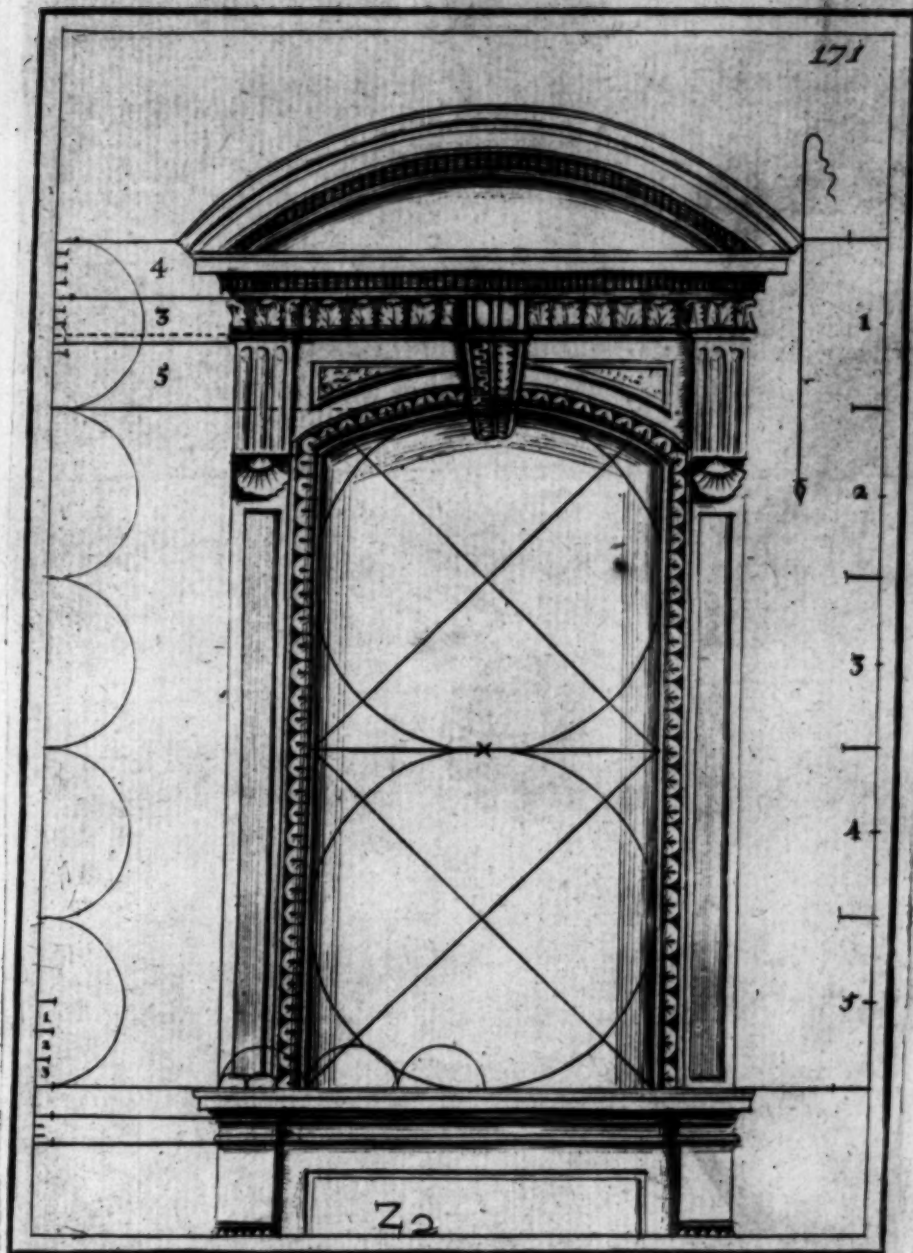




A Doore and windowe according to the Dorick Order

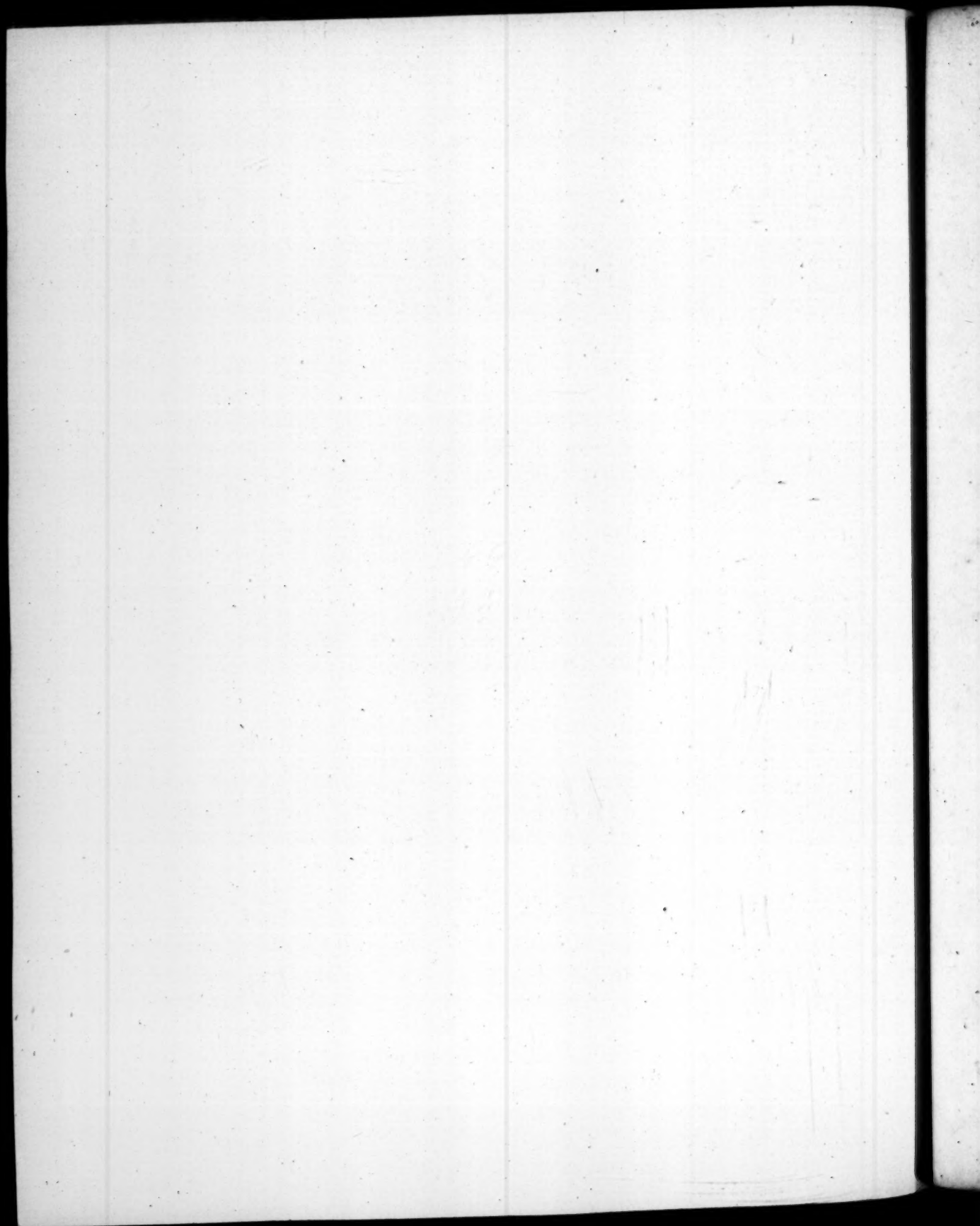
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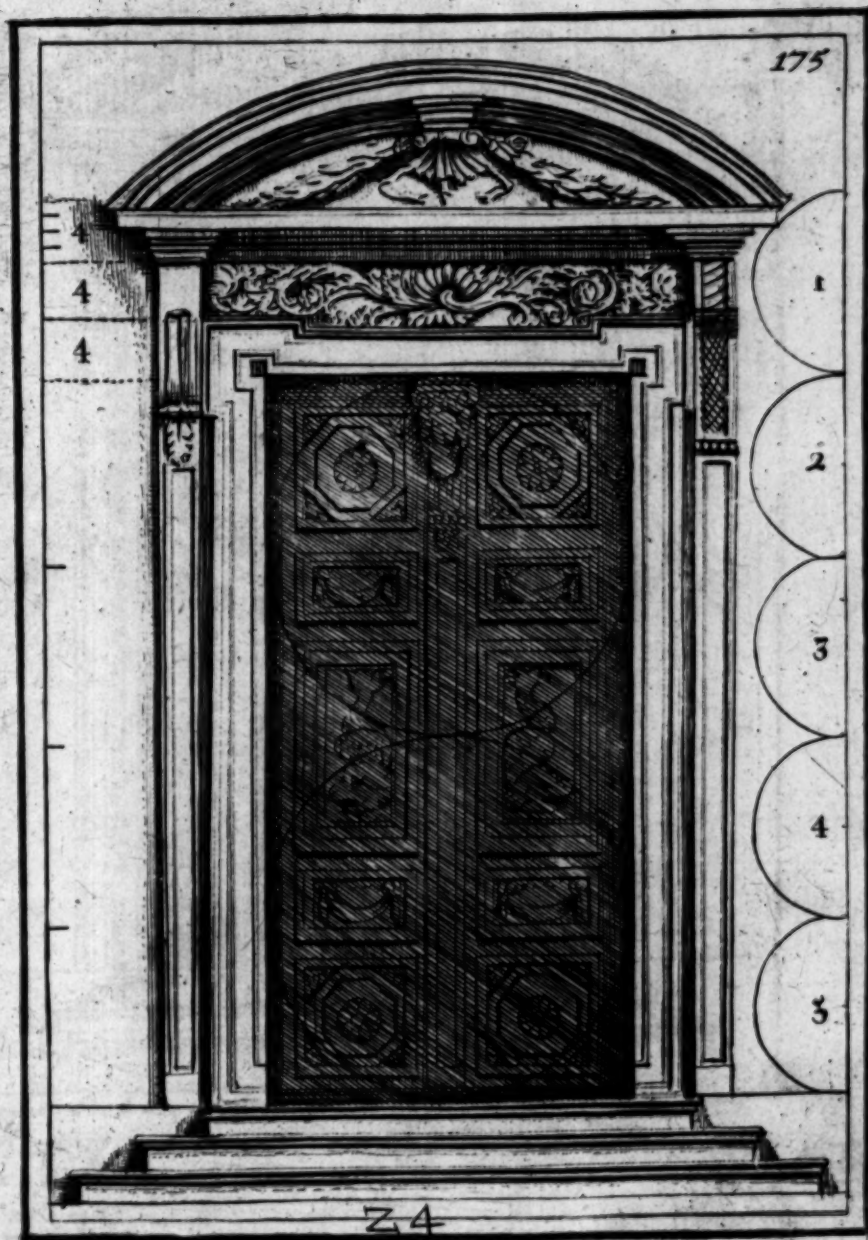




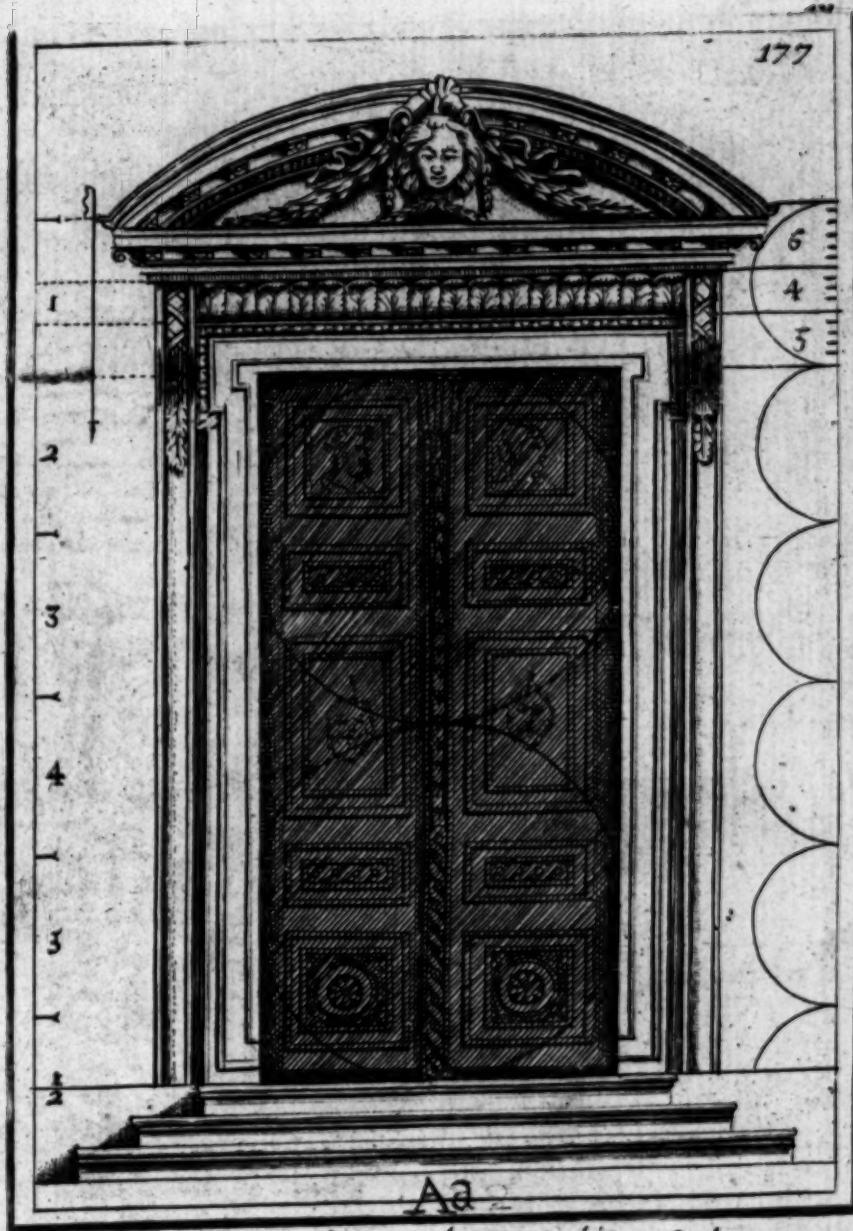
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A Doore according to the Corinthian Order

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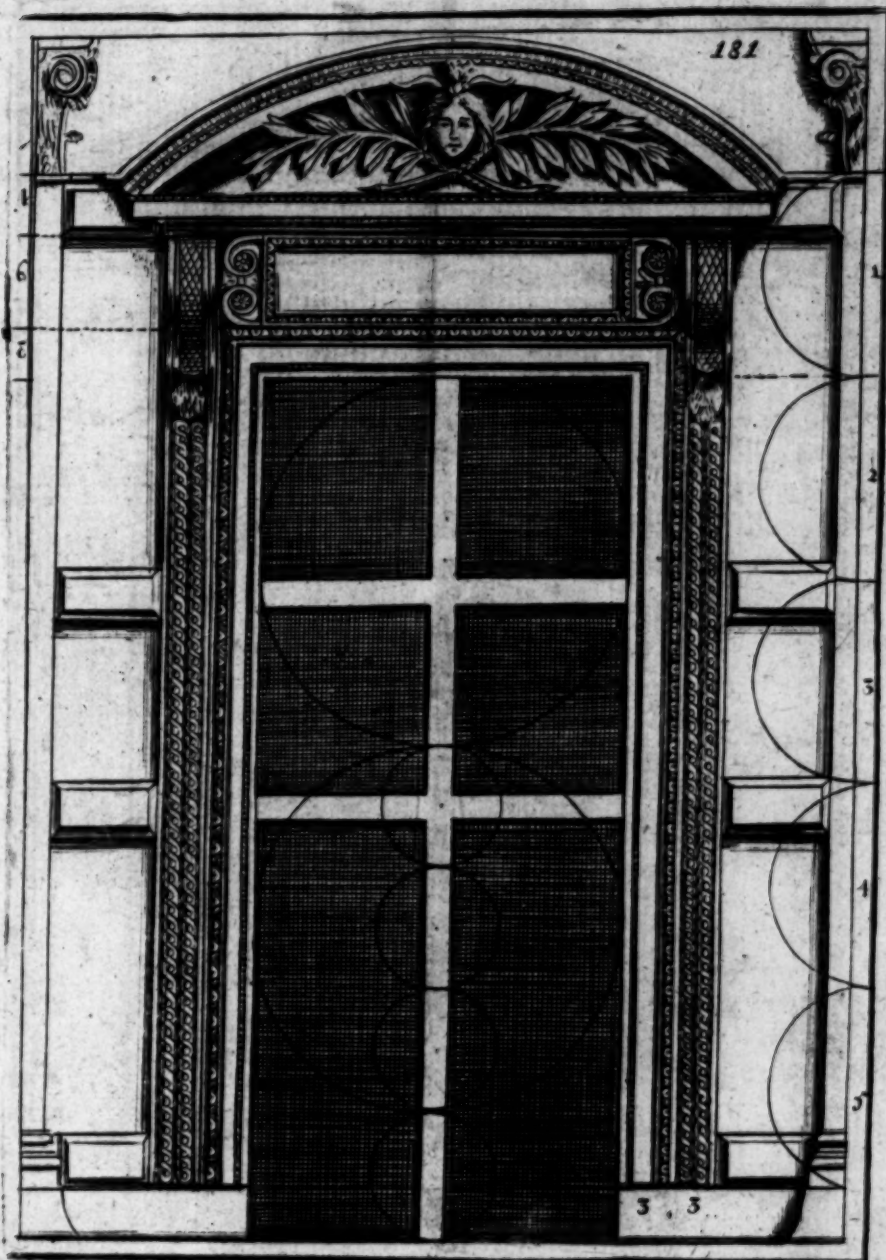


1 2 3 4 5 6 7 8 9 10 11 12

The Corinthian Capital Aao

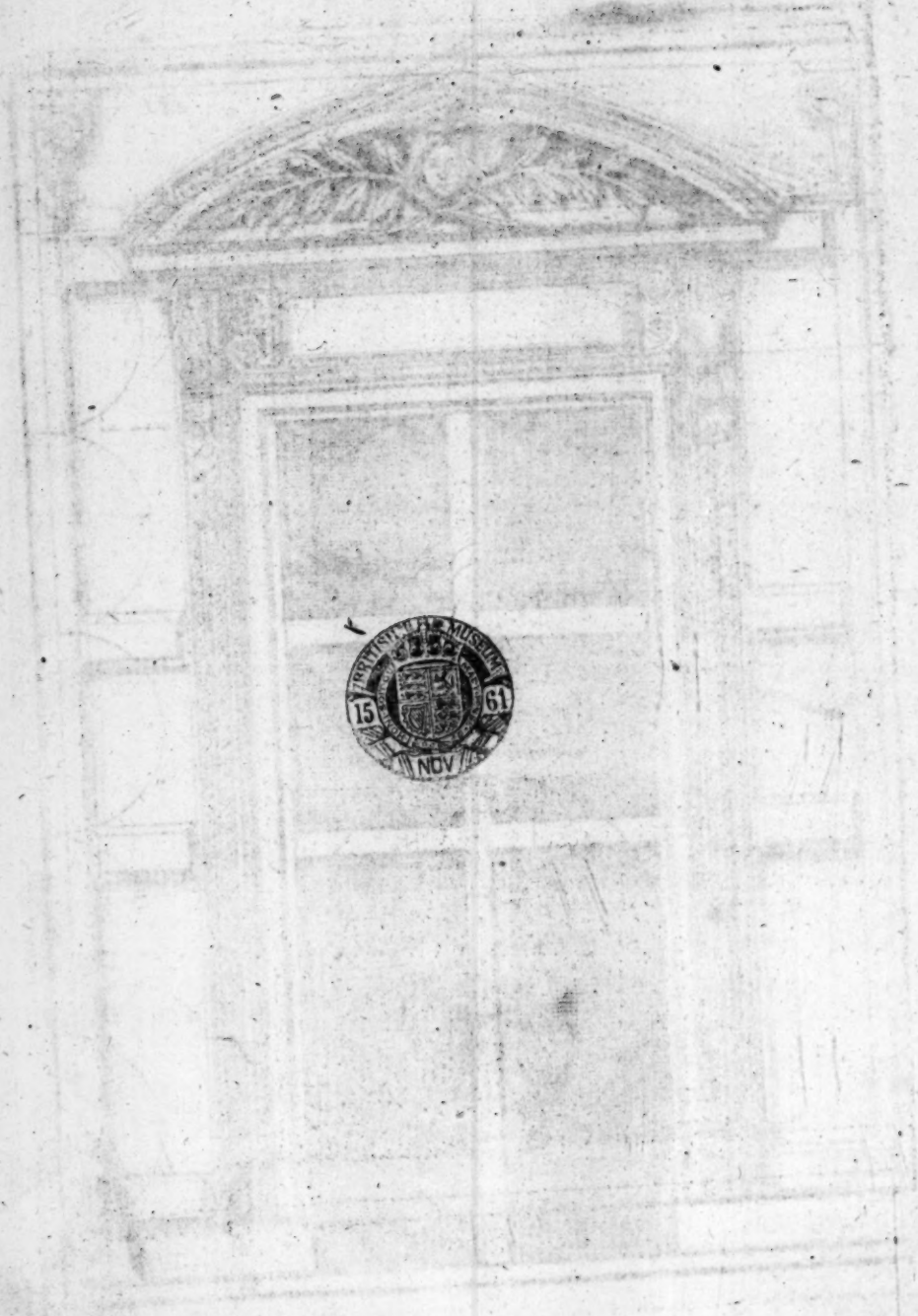
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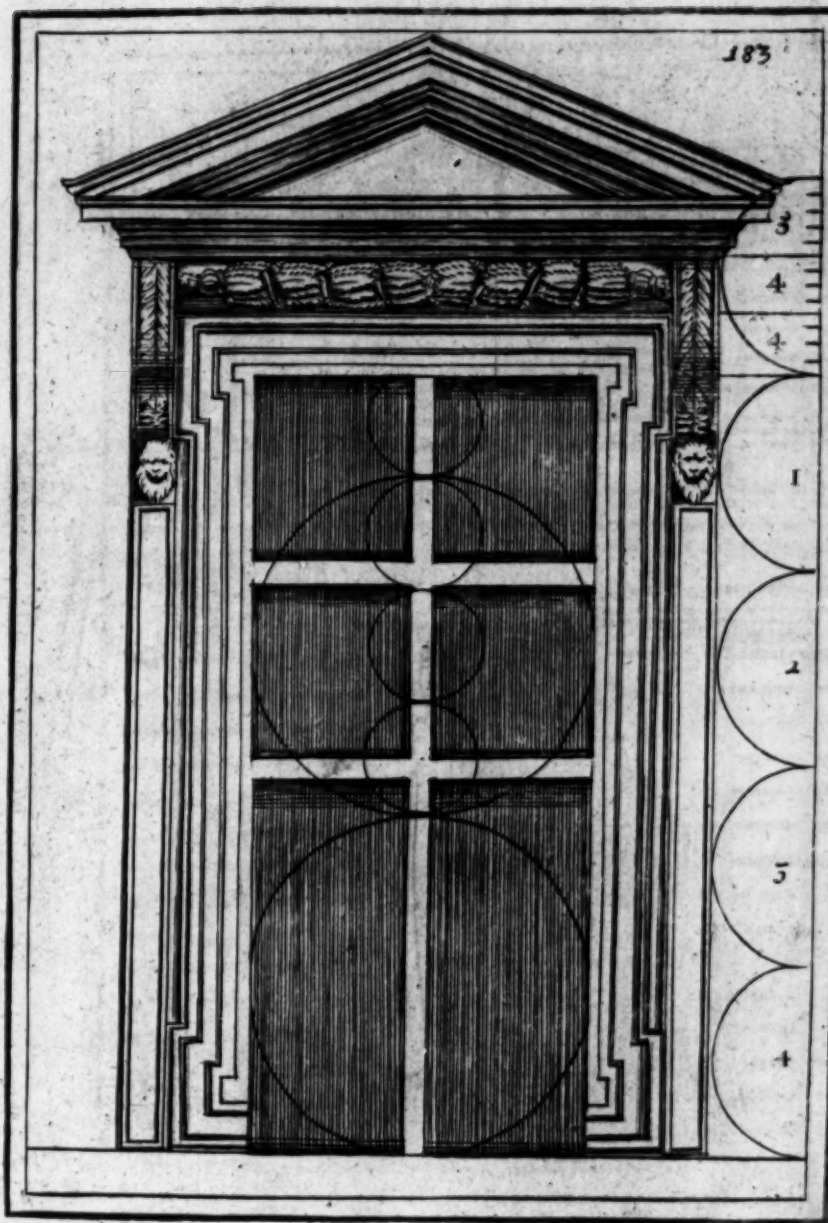




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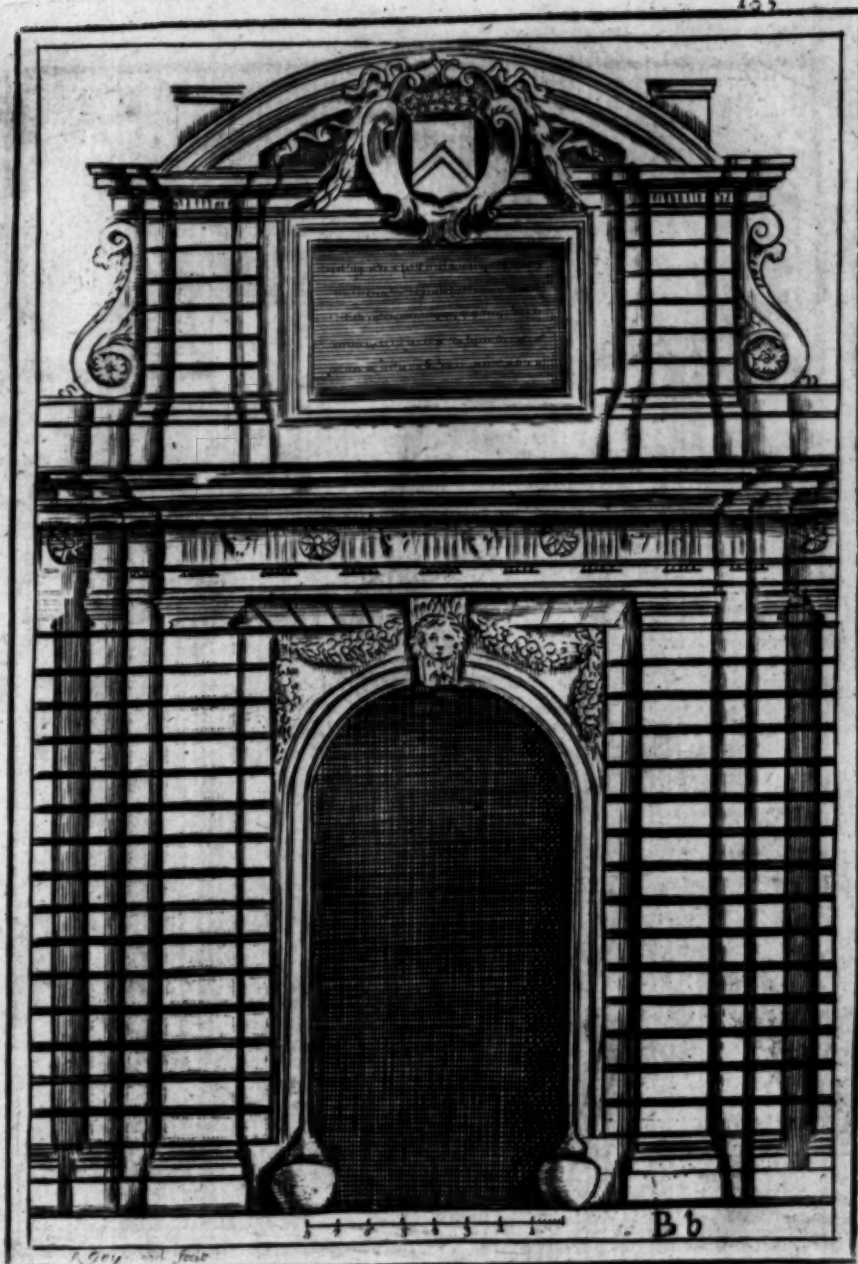
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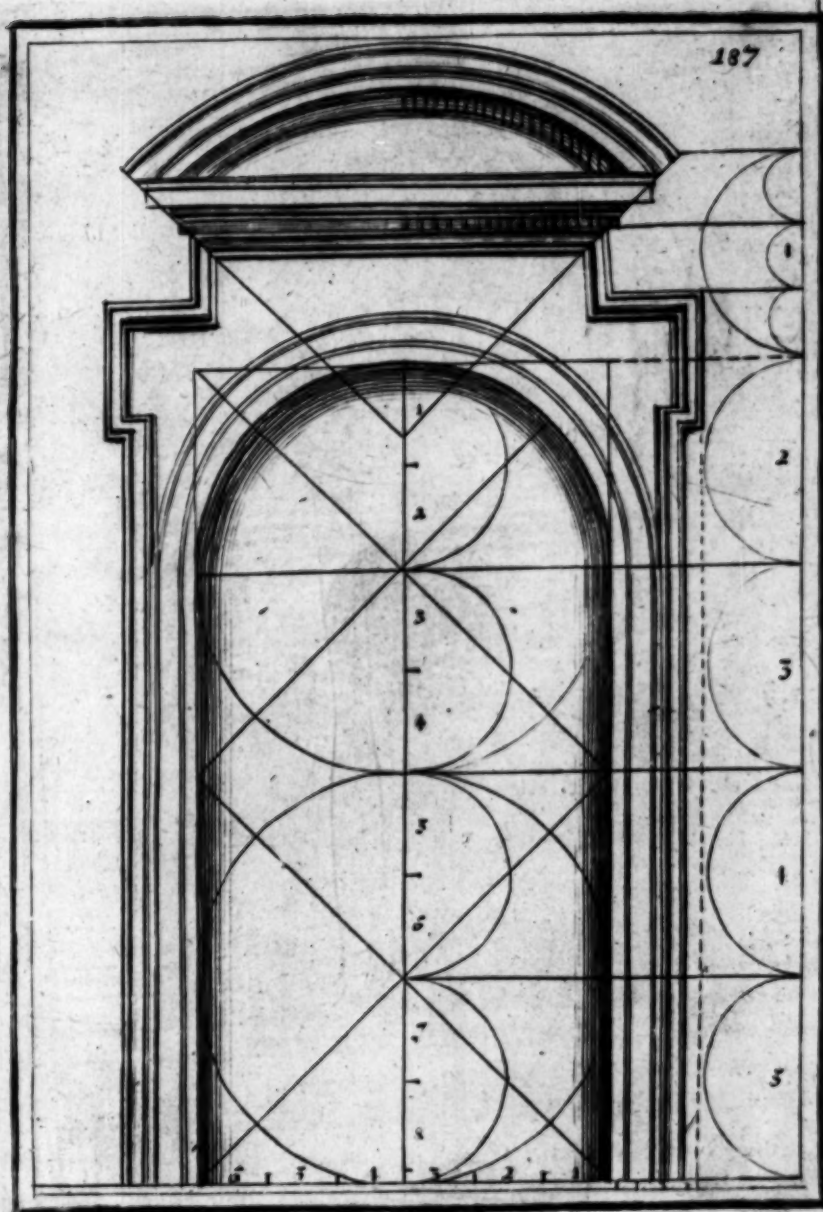
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Bb2

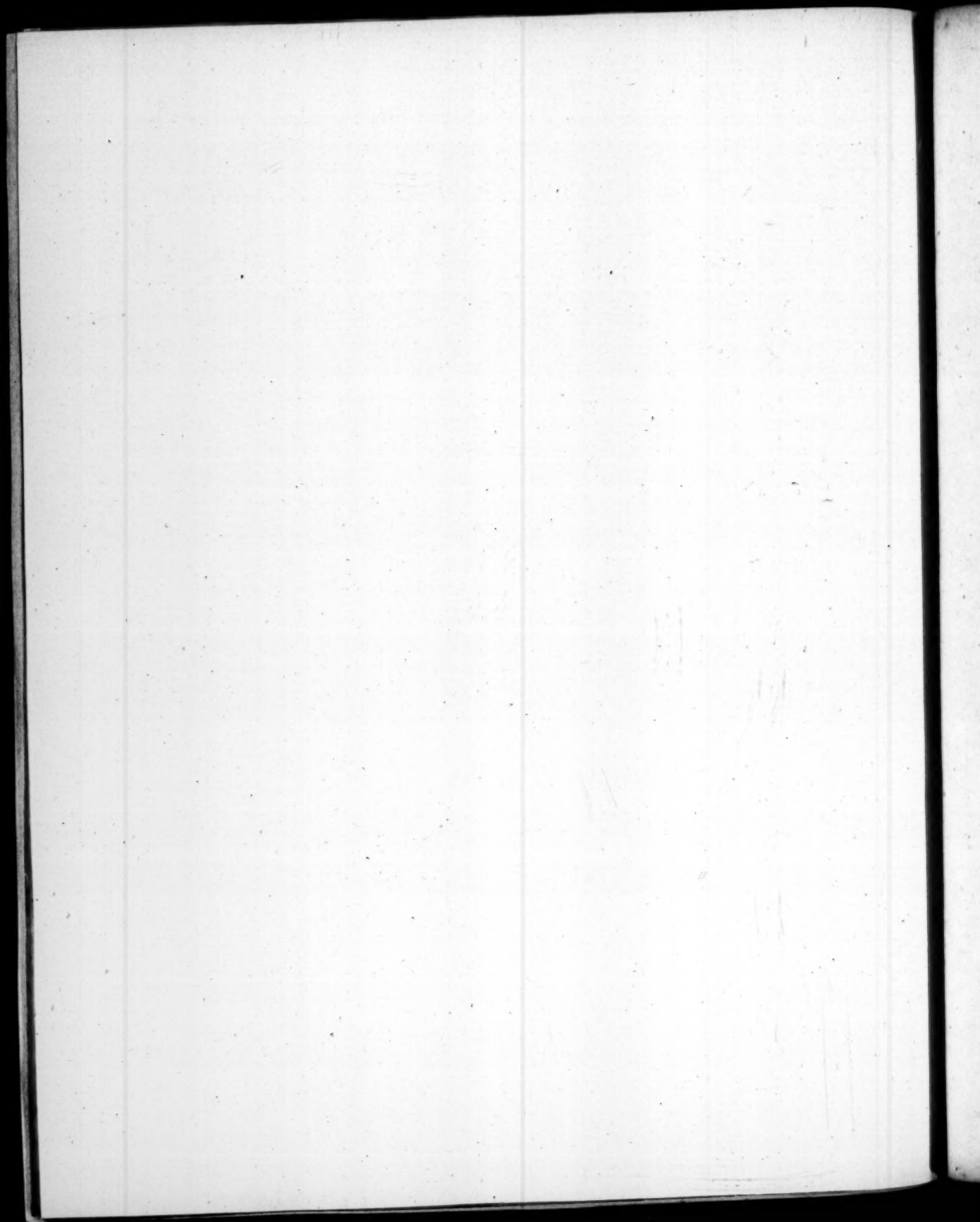
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C H A P. XXXVIII.

Of Chimneys in Halls, Chambers, Studies, and Wardrobes, and of their Proportions.

H *All-Chimneys* ought to be within Work six or seven Foot, and in great Buildings unto eight, between the two Jaums: And 'twill be convenient to make their *Funnels* in the Thickness of the Wall, if possibly it can be; if not, they must be set in a Place where they may correspond to those of the *Chambers*, the which spreads it self but little in the Middle, (as it hath been said;) and if it be possible, it must be so disposed, that the *Chimney* be seen in the Front by them that shall enter into the *Hall*.

Their Height must be four Foot and $\frac{1}{2}$, to five at most, from the bottom of the Plate-band to the Mantle-tree; they must project two Foot and a half, or three Foot at most, from the Wall unto the Mantle-tree. The Jaums must be from eight to twelve Inches in Breadth; and in great Buildings, ev'n to twenty four, or more, according to that Order of *Architecture* with which they are to be adorned.

C H A P. XXXIX.

Of Chamber-Chimneys, and of their Proportions.

C *Chamber-Chimneys* must have in Breadth five and $\frac{1}{2}$, or six Foot, and in great Buildings unto seven, and must be placed as I have said before, because of the Place for the Bed. Their Height must be four Foot, or 4 and $\frac{1}{2}$ from the Mantle-tree or Plate-

Plate-band, their *Projecture* must be two Foot, or two and $\frac{1}{2}$, from the Back to the Forefides of the Jamns.

CHAP. XL.

Of the Chimneys in Studies and Wardrobes.

Chimneys in these Rooms must be four Foot, four and $\frac{1}{2}$, or five Foot at most in Breadth: Their Height from the Mantle-tree must be like to that above of four Foot and $\frac{1}{2}$, and also their *Projecture* two Foot, or two and $\frac{1}{2}$, from the Back.

CHAP. XLI.

Of the Funnels of Chimneys.

Funnels of Chimneys must be carry'd through the Roof, and above the Ridge, three Foot, four, or five Foot at most, that they may carry the Smoke into the Air. You must take care that they be made neither too wide nor too narrow; for if they be too wide, the Wind will drive back the Smoke into the Room, and will not permit it freely to ascend and pass forth, and in Funnels too narrow, the Smoke not having free passage, is repulsed, and returns backwards: Therefore 'tis that Chamber-Chimneys are not made narrower than ten or eleven Inches, nor broader than fifteen, which is the ordinary Depth of Funnels of great Kitchen-Chimneys, by reason of the great Fire that is made therein: and for their Breadth, they must be four or five Foot at most within the Work, from the Place where the Breast ends, unto the Top of the Funnel. Now the said Breast reacheth from the Mantle-tree unto the Ceiling or Pitch of the Arch, always diminishing within the Work, until you come

to the Measures of Depth and Breadth before mentioned; and from thence arising unto the end of the Funnel, it must be carried up as even as you can possibly; for failing in this, it often happens the Smoke is offensive.

CHAP. XLII.

What is to be observed in making Chimneys, and the Fashion which was practised among the Antients.

THE *Faums* and *Mantle-trees* of Chimneys must be curiously wrought; for rustick Work doth not appear well, unless it be in very great Buildings, for the Reasons aforesaid.

The Antients, to heat their Chambers, did serve them in this Manner: They made their Chimneys in the middle with Columns or *Corbeaux* which bore up the *Architrave*, upon which were the Funnels of the Chimneys which convey'd away the Smoke; of which kind, one may be seen at *Bay* near the *Piscine* of *Nero*, and one which is not far from *Civita Vecchia*; and when they would not have Chimneys, they made in the Thickness of the Wall Pipes or Funnels, thorough which ascended the Heat of the Fire which was under the Chamber, and was conveyed forth thorough certain Vents and Conduits which was on the top of the Funnels. Much like this the *Trenti* Gentlemen of *Venice*, in the Summer, refreshed their Chambers at *Costoza*, their Country-dwelling: For in that Place there are great Mountains in which are certain great Caves, which in Times past were Quarries, which (I suppose) *Vitruvius* means, in his Second Book, where he treats of *Stone*. In these Caves are ingendred extreme cool Winds, which these Gentlemen caused to be brought into their Houses thorough certain *Subterranean* Vaults, and by the means of certain Trunks, like to those whereof I have spoken before, make them run thorough all the Chambers, opening and shutting them at pleasure, to take more or

less of Air, according to the Time and Season; and this Place would be wonderful, were it only for this great Commodity; nevertheless, that which renders it yet more admirable and worthy to be seen, is, the *Prison of the Wind*, which is a certain *Chamber* under Ground, made by the Most Noble Seigneur *Frenti*, and by him call'd *Æloa*, where many of those Trunks and Conducts of Wind are discharged: and to render it beautiful and worthy of this Name he hath given it, he hath spared neither Care nor Charge.

C H A P. XLIII.

Of Stair-Cases, and their divers Manners, and the Numbers and Greatness of their Steps.

THere ought to be great Care taken in the well placing the *Stair-Case*; for there is not a little Difficulty to find a Place convenient, so as the *Stairs* may be distributed without Prejudice or Hindrance to the rest of the Building; 'tis therefore that ordinarily they are placed in the Corner of the Building, or on the Wings, or in the middle of the Front, which is but seldom, unless it be in great Buildings; because much of the Stone-work will be hindred by reason of the *Stairs* being in the middle, unless the House be Double.

There are three Openings necessary to the least *Stair-Case*; the first, is the Door-way that leads to them, which is the better when it is spacious, and pleaseth me most, if it be in such a Place, where, before one approacheth, one may see the best Part of the House: For altho' the House be little, by this means it appeareth much larger; nevertheless, it behoves that the said Door-way be obvious, and easy to be found.

The

The second Opening, is that of the *Windows*, which are needful to give Light to the *Stairs*; and when there is but one, let it be in the middle as near as you can, to the end that all the *Stair-Case* may be enlightned.

The third Opening, is the Landing-place, by which we are to enter into the Rooms above, and ought to lead to Places large, fair, and well adorned.

Stairs will be well made, if they be spacious, light, and easy, so as they may invite People to go up.

They will be lightsome, when they have a perfect Light that disperseth it self to all Parts equally.

They are spacious when they appear not little, nor narrow, in respect of the bigness and quality of the *Fabrick*; but they must never be narrower than four Foot, to the end that if two Persons meet, they may commodiously pass one by the other; they may be made of five or six Foot, or seven and a half, and to great Buildings unto ten or twelve Foot broad to every Flight, and they must be made as commodious as possibly you can.

C H A P. XLIV.

Of the Height and Breadth of Steps.

THE *Steps* ought not to be more than 6 Inches high; and if they be lower, they must chiefly be to long and continued *Stairs*; they will be so much the easier, because one needs not lift the Foot so high, but they must never be lower than four Inches.

Their Breadth ought not to be less than a Foot, nor more than fifteen or sixteen Inches.

The Antients observed, not to make the Number of *Steps* even, to the end that beginning to ascend with the Right Foot, they might end with the same Foot, which they took to be a good *Omen*, and with greater Devotion so to enter into the Temples.

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C H A P. XLV.

Of divers Manners of Stairs.

S*Tairs* are made Straight, or Winding: The Straight are made spread abroad into two Branches or Passages; or Square, which turns into four Branches or Passages; and to make them in this last Manner, all the Space must be divided into four Parts, whereof two must be for the *Stairs*, and two for the Vacancy; by the middle whereof, if it be open, the *Stairs* receive Light. They may be made with a Wall within; and then within the two Parts which are taken for the *Stairs*, the Thickness of the Wall ought to be comprehended and inclosed, which makes the *Cafe* or *Newel*; they may also be made without a Wall within: These two sorts of *Stairs* were made by the Invention of Seignor *Lovis Cornaro* a Gentleman of excellent Judgment.

Winding-Stairs, some are made Round, some Oval, some with a *Newel* in the Middle, and some open; and such *Winding-Stairs* are made chiefly where there is little room, because they take up less room than the *Straight-Stairs*, yet not so easy to ascend. Those which are Open in the Middle are very handsome, because they may have Light from above; and those who are above, may see those who are coming up, and are seen also by them.

Those which have a *Newel* in the middle, having but little room, are made in this Manner: You must divide the Diameter into twelve Parts, ten whereof are for the *Stairs*, and the two which remain are for the *Newel* in the middle; or divide the said Diameter into eight Parts, six whereof are for the *Steps*, and two for the *Newel*; and if there be much room, you must divide the Diameter into three Parts, whereof two are for the *Stairs*, and one for the *Newel*, as in the Design A; or otherwise you may divide the Diameter into seven Parts, of which take three for the *Newel* in the middle, and four for the *Stairs*. Just in this Manner is the *Stair-Cafe* of the Column of *Trajan* at *Rome*; and if you make *Stairs* Winding, as in the Design B, they

they will be handsomer, and more agreeable, and longer than if they had been straight; but to *Stair-Cases* Open in the Middle, the Diameter must be divided into four Parts, two whereof must be for the Middle, and two for the *Stairs*.

Besides the Fashion of *Stairs* which are in Practice, there hath been a *Winding-Stair*, invented by *Mark-Anthony Barbaro*, a Gentleman of *Venice*, of excellent Judgment, who made excellent Experiments in very narrow Places, where there is no *Newel* in the middle; and the *Stairs* in their Turning are much longer, and are divided after the Manner aforesaid.

Those which are Oval are divided in the same manner as the Round; they are very handsome and pleasant, because all the *Windows* and *Doors* are in the middle and head of the Oval, and are very commodious. I have made one Open in the Middle in the Monastery of *Charity* at *Venice*, which hath succeeded very well.

There is another very handsome manner of *Stairs*, which King *Francis* the First caused to be made in the Castle of *Chambor* near *Bloyse*, and is in this manner: There are four *Stair-Cases* which have four Entrances, to wit, one Entry to each, and go up the one over the other in such manner, that being made in the middle of the Building, the four may serve for four Apartments, so that the Inhabitants of one need not go up and down the *Stairs* of the other; and because it is open in the middle, they all see each other go up and down, without any hindrance the one to the other. This Invention being new and handsome, I have placed it here, and marked with Letters from the Foot to the Head, to the end every one may see where each *Stair* begins, and where it ends.

There were also the *Portico's* of *Pompey* at *Rome*, leading to the Place of the *Jews*, *Winding-Stairs* of an admirable Form; for being placed in the Middle, in such manner that they could not receive Light but from on high, they were set upon Columns, to the end that the Light might distribute it self to all Parts alike; according to which Example, *Branante*, an excellent Architect in his Time, made one of them at *Belvedere*, and without *Steps*, having the four Orders of Architecture, *Dorick*, *Ionick*, *Corinthian*, and *Composita*. To make these *Stair-Cases*, you must divide

vide the whole Space into four Parts, two whereof are for the void Place in the Middle, and one on each side of the *Steps* and Columns.

There are many other Fashions of *Stair-Cases* in ancient Edifices, as *Triangulars*; and of this sort are those of the Cupolo of *St. Maria Rotunda*, which are open in the middle, and receive Light from above: Those also which are at *Santo Apostolo* in the same City, by which we go to *Mount Cavello*, which are very magnifick, and they are Double. Many Persons have taken the Model thereof, and carried it to a Temple on the top of the Mountain, (as appears in my Book of *Temples*;) and of this sort is this last Design.

You must note, that in *Stair-Cases* which are square or oblong, when you are constrained to place *Steps* in the Angles, in turning you cannot make more than six in a Semi-circle, which are three in $\frac{1}{4}$ of a Circle, and is then when the *Stair-Case* shall have but six or seven Foot in Breadth within Work, which is the least that can be made.

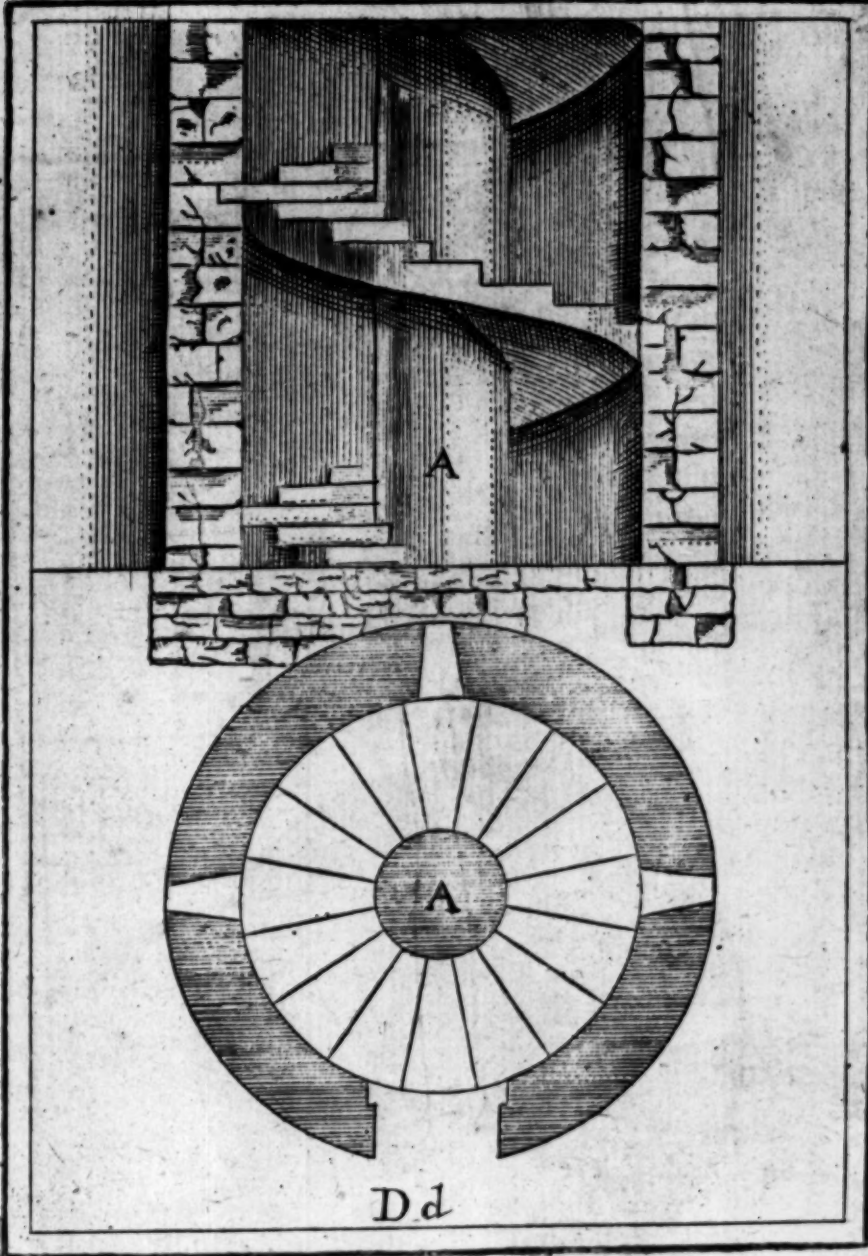
To *Stair-Cases* of eight Foot broad, you must put eight *Steps* from the Angle, turning to a Semi-circle, which will be Four to $\frac{1}{4}$ of a Circle.

And to *Stair-Cases* from nine to ten Foot broad, you must put ten *Steps* to a Semi-circle.

If they have eighteen Foot, more or less, you may make twelve *Steps* to a Semi-circle.

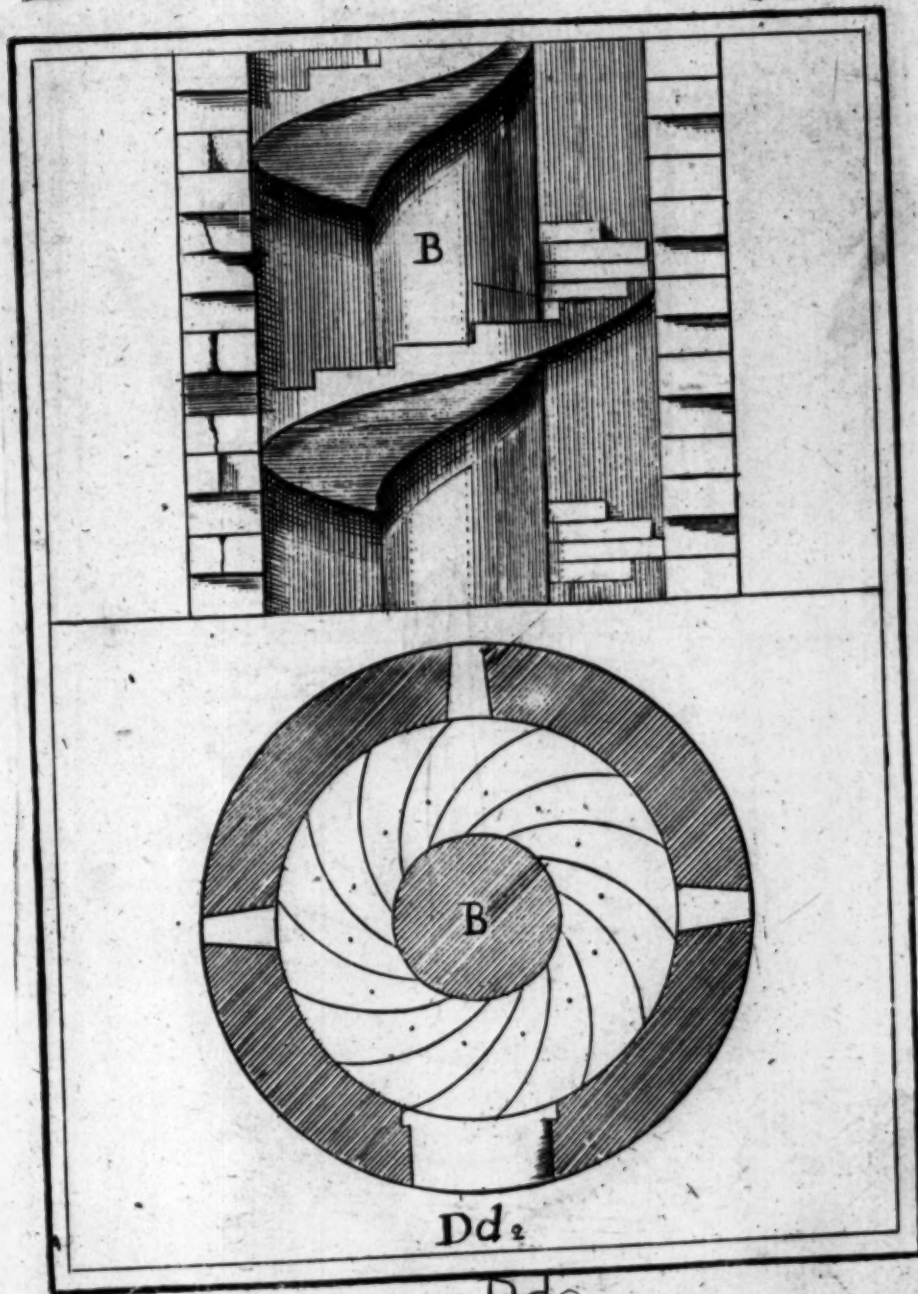
You must take heed that the Landing-place of the *Stairs*, which is the Space between the Wall and the *Steps* which one ascendeth, and which doth distribute to the Apartments, be broader a fourth Part at least than the Length of the said *Steps*.

Example

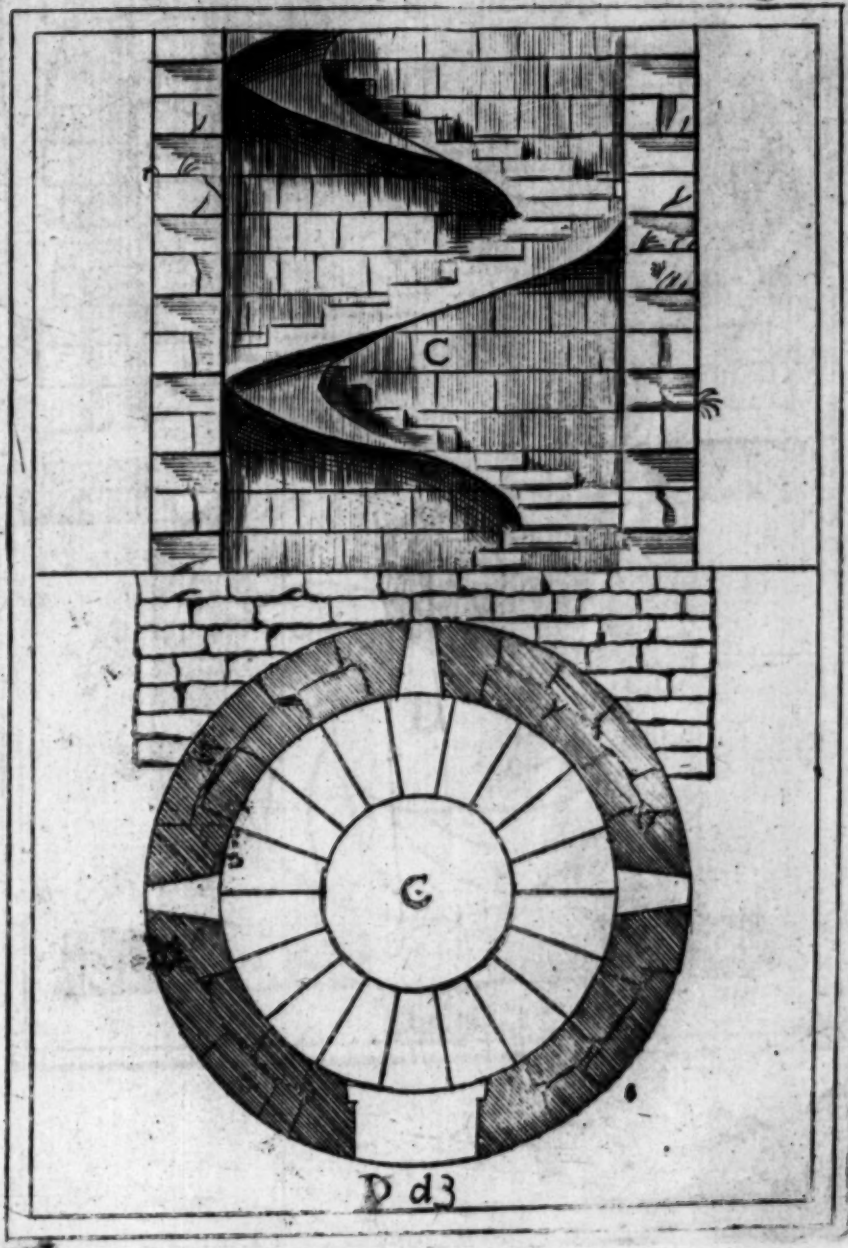


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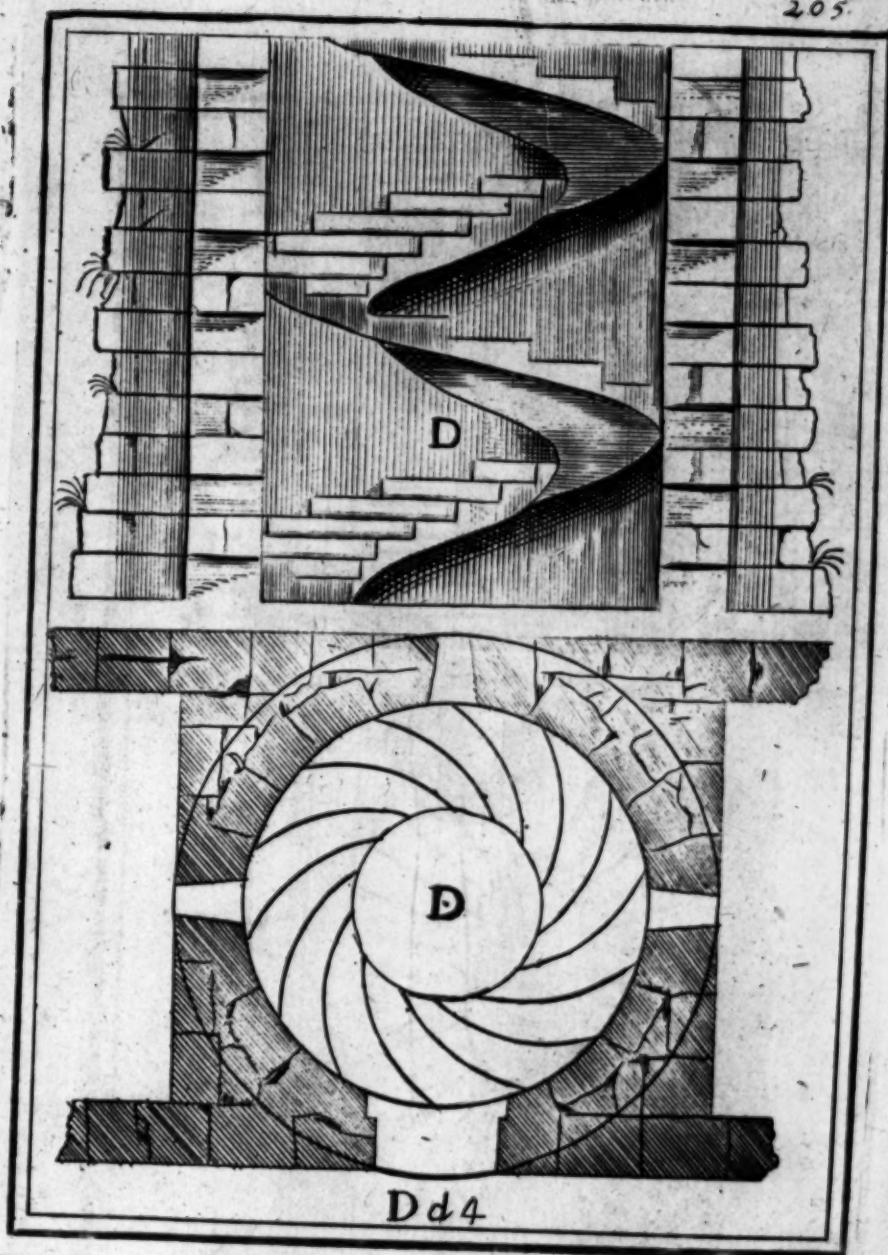




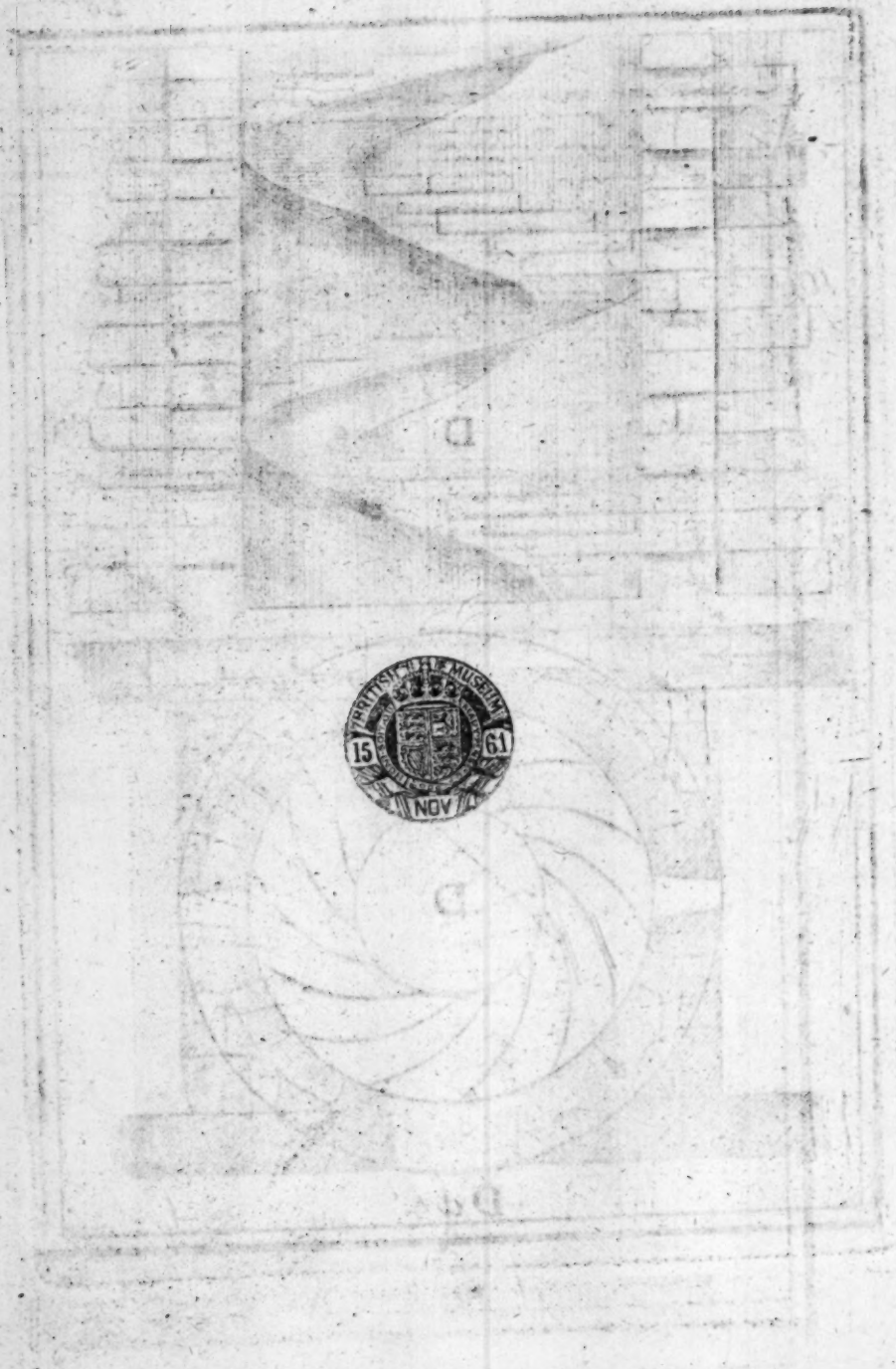


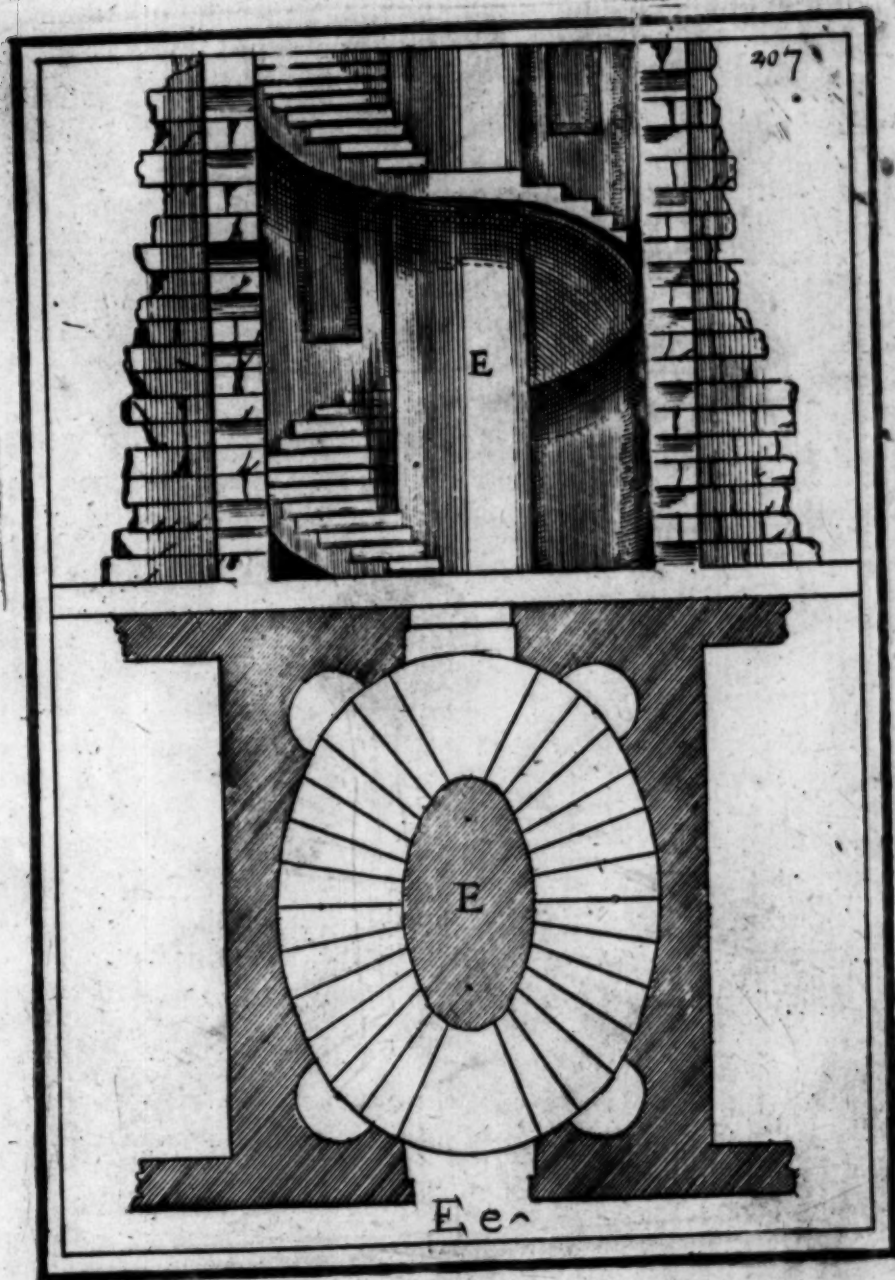
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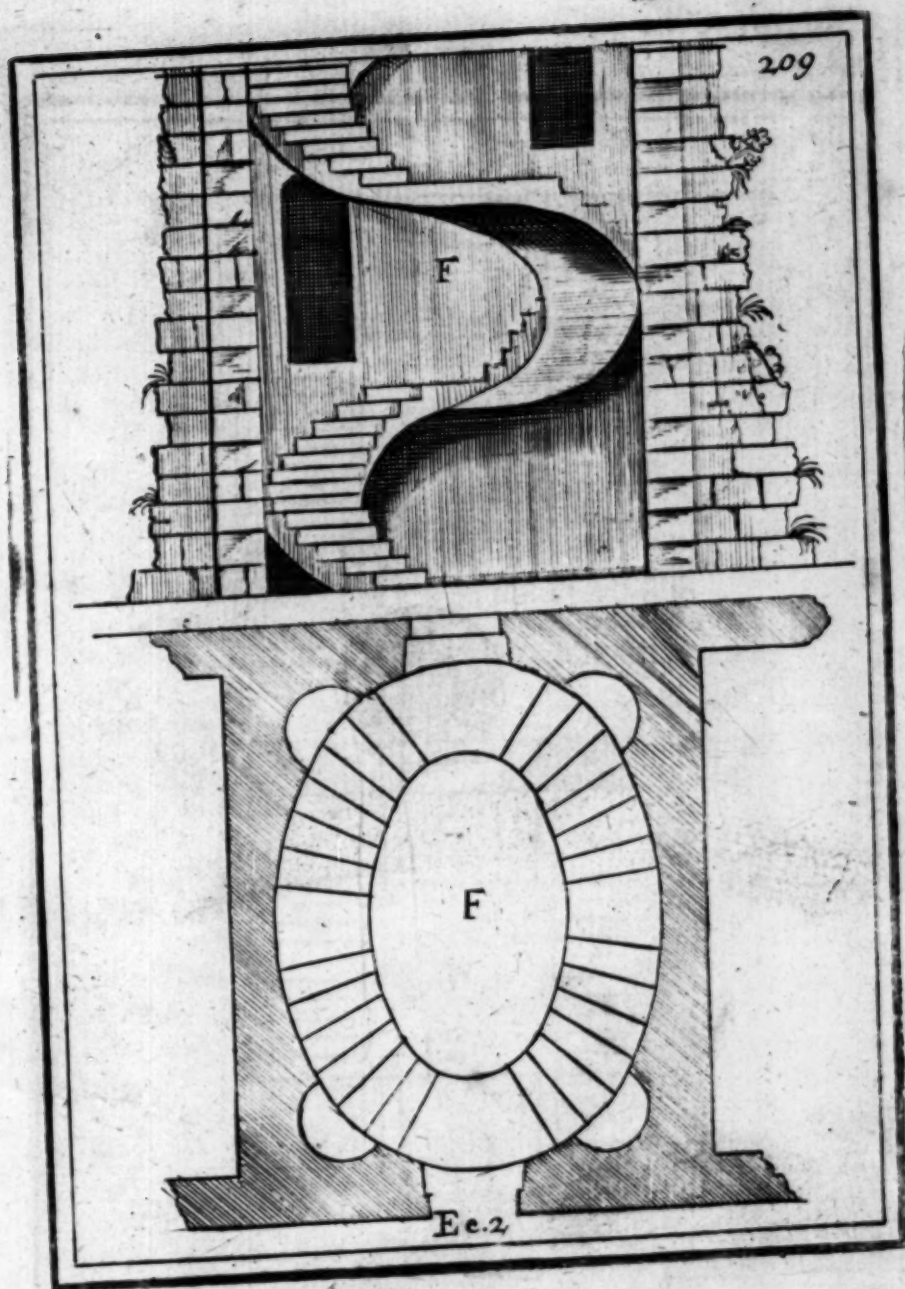
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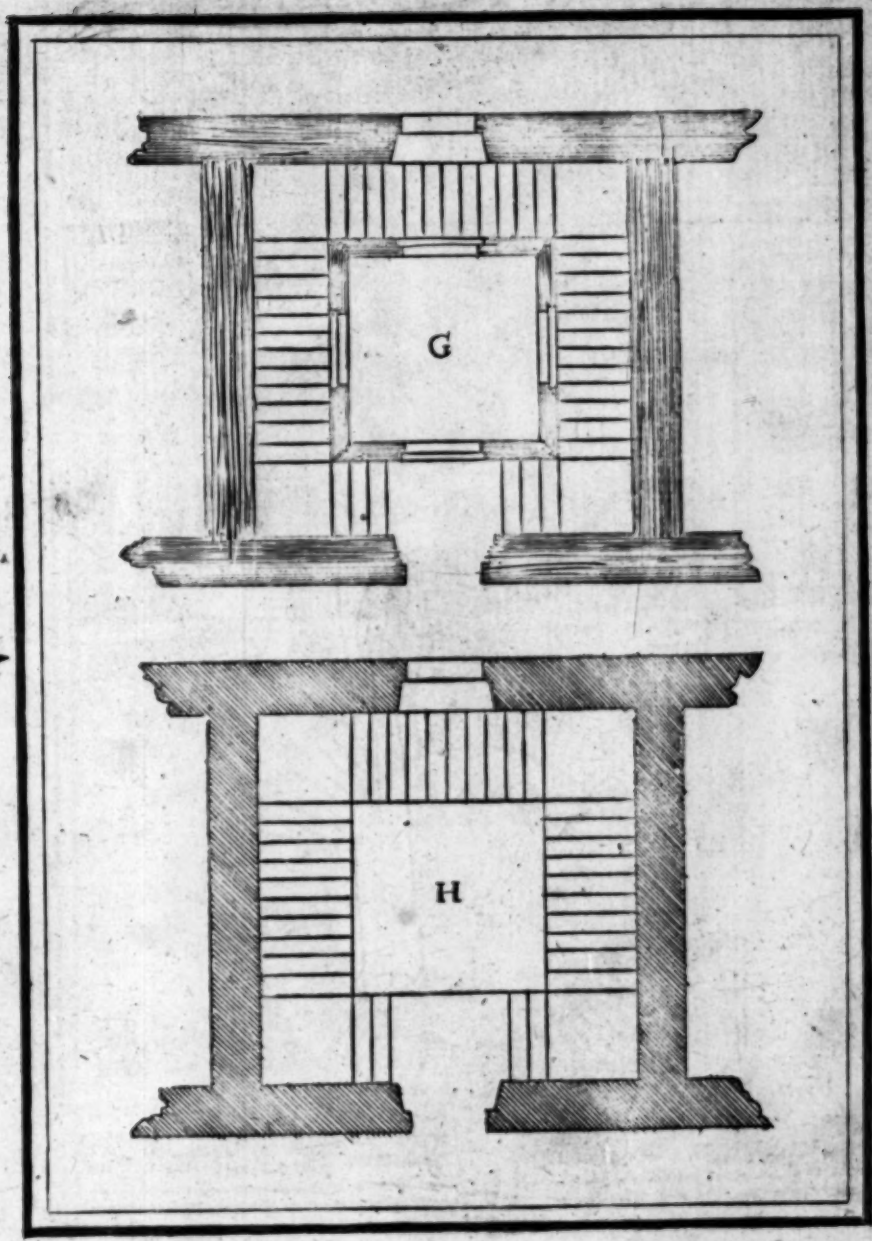
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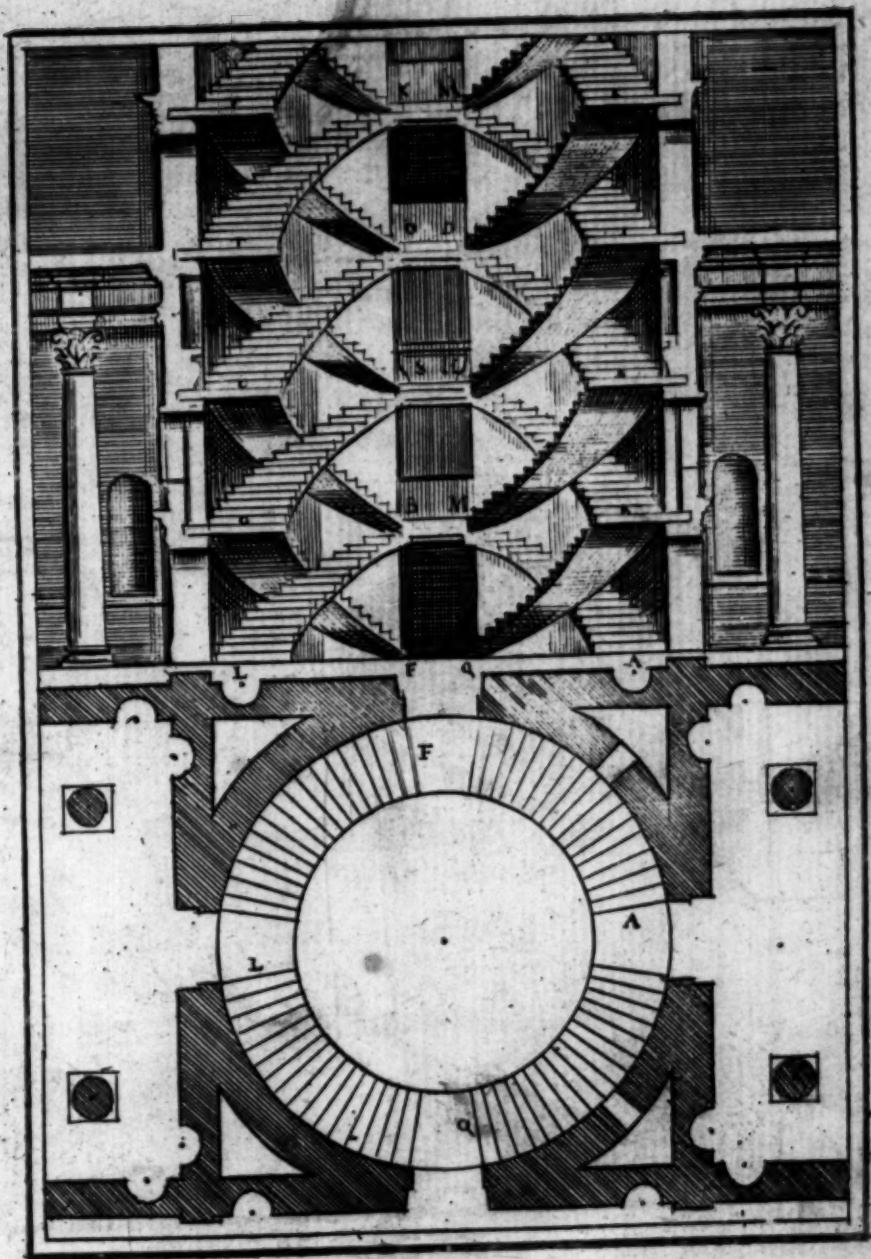
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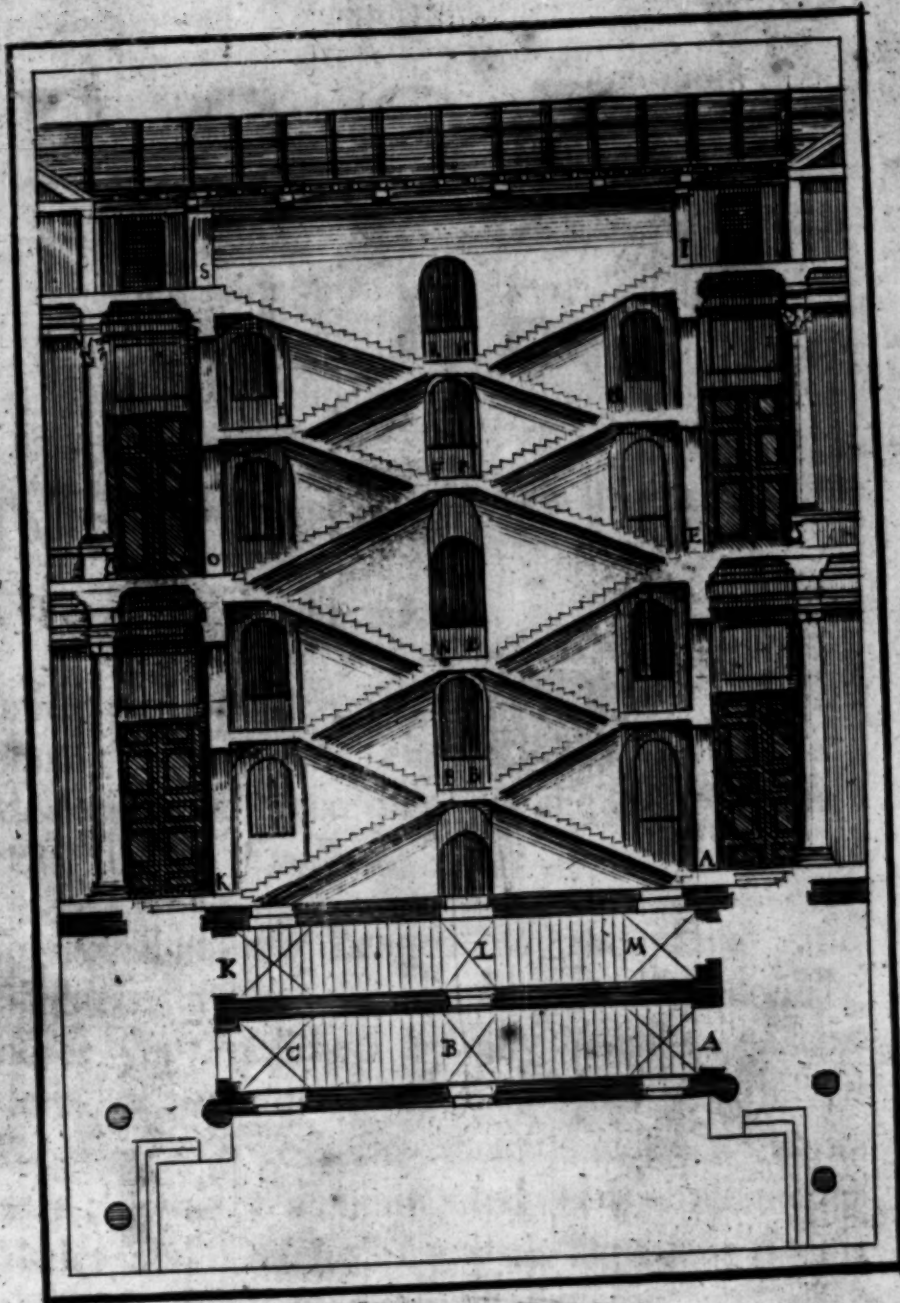
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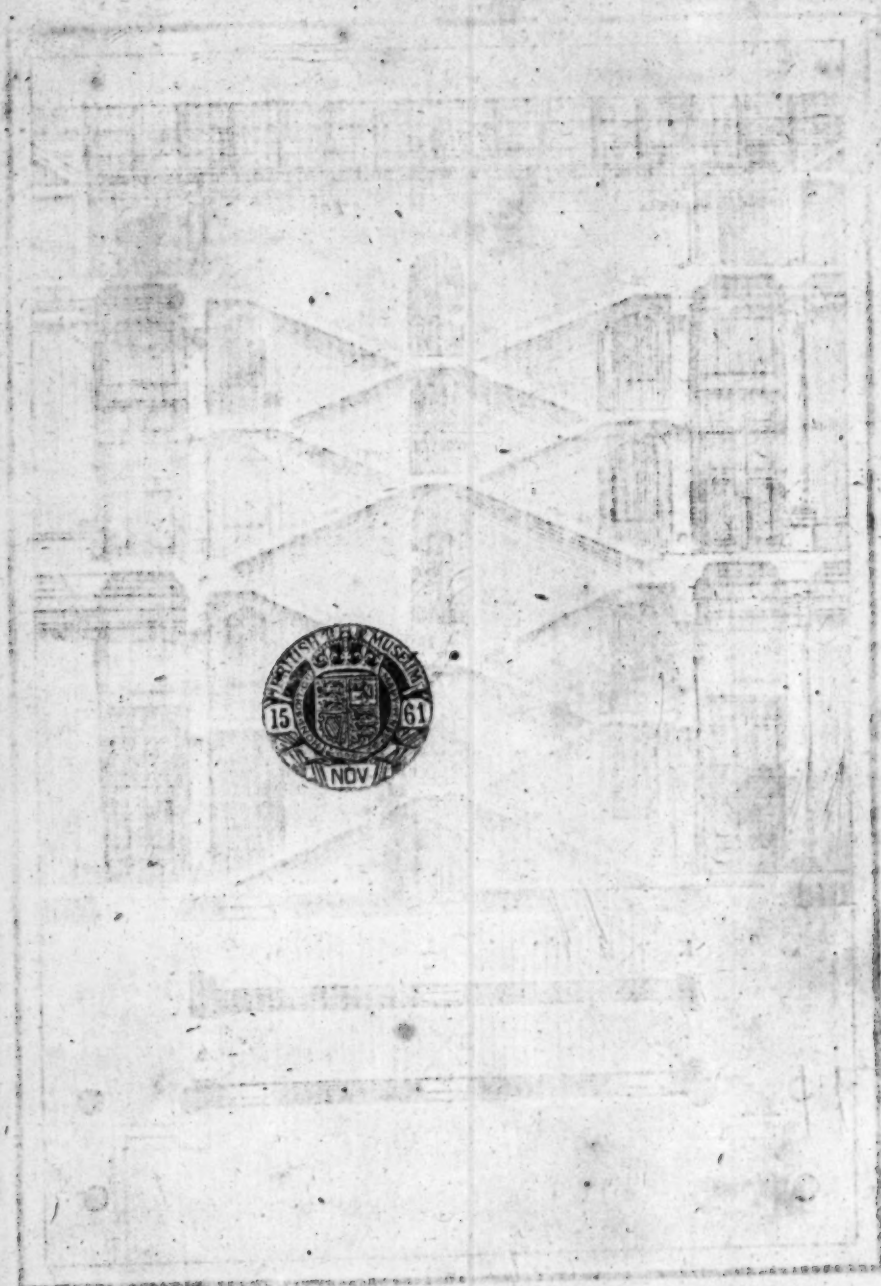
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ROOFS.

RULES

AND

INSTRUCTIONS

Framing all Manner of ROOFS, whether Square or Bevel, either Above Pitch, or Under Pitch, according to the best Manner practised in England.

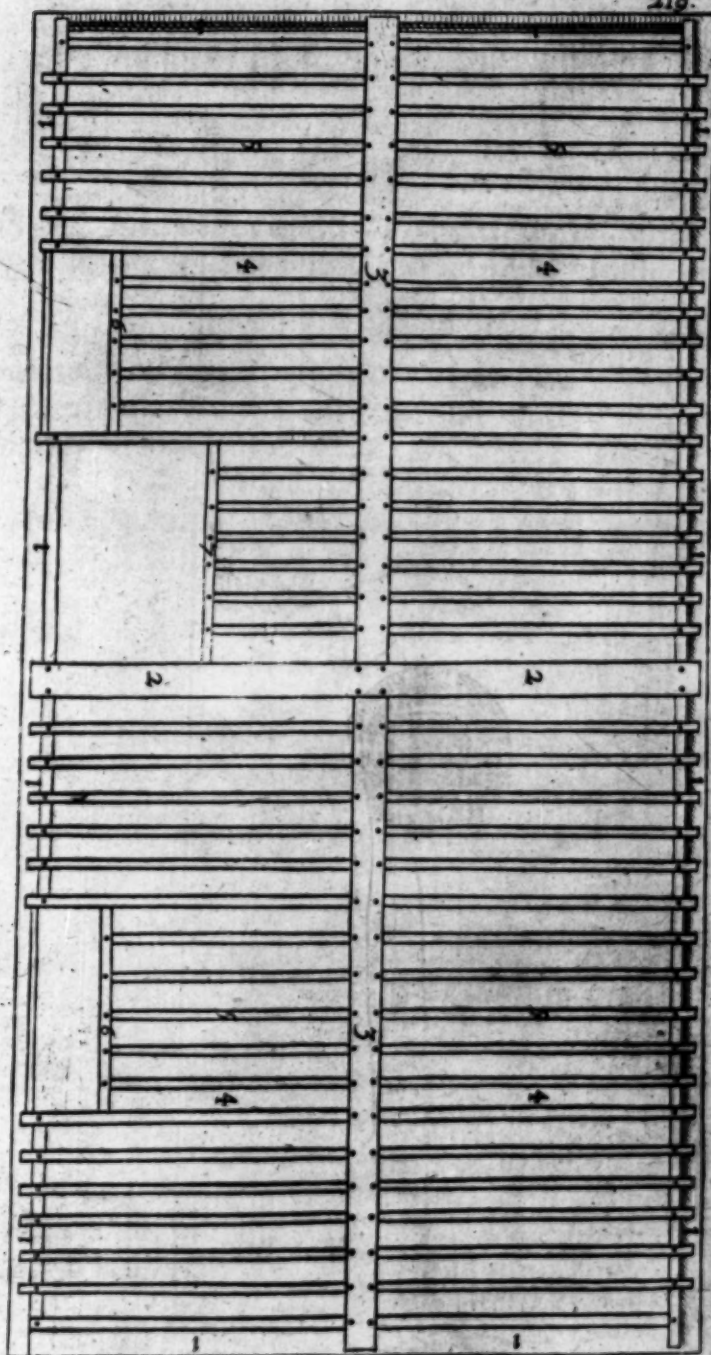
Also to find the Length of the Hips and Sleepers, with the Back or Hip-mould; never yet Published by any Architect, Modern or Antique; a Curiosity worth the Regard ev'n of the most Curious Workmen: Exactly demonstrated in the following Rules and Designs, by that Ingenious Architect Mr. William Pope of London.

C H A P. XLVI. Of Roofs.

HAVING raised the Walls to their designed Height, and made the Vaults, laid the Joists, brought up the Stairs, and performed all those things spoken of before; we are now to raise the Roof, which embracing every part of the Building, and with its Weight equally pressing upon the Walls, is as a Band to all the Work; and besides, defends the Inhabitants from Rain, from Snow, from the burning Sun, and from the Moisture of the Night; adds no small help to the Building, casting off from the Walls the Rain-water, which altho' for a while seems to do but little Hurt, yet, in process of Time, is cause of much Damage. The first Men (as saith *Vitruvius*) built their Houses with Flat Roofs; but finding that thereby they were not defended from the Weather, they (constrained by Necessity) began to make them Ridg'd, (that is to say) Raised in the Middle: These Roofs are to be raised to a Higher or Lower Pitch, according to the Country in which they are; wherefore, in *Germany*, by reason of the great quantity of Snow that falls there, they raise their Roofs to a very great Pitch, and cover them with Shingles, which are small pieces of Wood, or of thin Slate or Tiles; for if they should raise them otherwise, they would be ruin'd, by reason of the Weight of the Snow. But we who dwell in a more temperate Country, ought to chuse such a Pitch which may secure the Building, and be of a handsome Form; therefore we divide the Breadth of the Roof into four equal Parts, and take three, which makes the most agreeable Pitch for our Country, and is the Foundation for the Raising of any manner of Roof, whether Square or Bevel, (as appears in the following Designs and Descriptions.)

The manner of Framing a Floor, with the Names of each Member.

1. The Thickness of the Wall, and Lintel or Wall-plate; and as it is in Timber-work, then a Bressummer.
2. The Summer.
3. Girders framed into the Summer.
4. Spaces between the Joists.
5. Joists.
6. Trimmers for the Chimney-way.
7. Trimmers for the Stair-Case, or Well-hole for the Stairs.



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C H A P. XLVII.

Of the Design A.

A A
A B

THE Breadth of the House, Windows, Cornices, and Facades, the Length of the Railings, and Fittings, which ought to be $\frac{1}{2}$ of the Breadth of the House A A.

The principal Rafter to be cut with a Knee, (as in the Design) that they may the better support themselves, and the Burthen over them, upon the Upright of the Wall, and also secure them from the slipping in of the Rains, which otherwise would happen, if the Rafter were made plain and pointed.

The Beam to the Roof, or Girder to the Gutter-Floor, ought to Project without the Work as far as the Fitting or Shoring, which is the Projection of the Cornice.

This Manner of framing the Roof will be useful from 20 to 30 Feet or thereabouts.

1. Ground-Plane.
2. Girder, or Beaming Interval, or Brackening.
3. Beam to the Roof, or Girder to the Gutter-Floor.
4. Principal Rafter, and Upright Post.
5. Window.
6. Gutter.
7. Interval.
8. Brick-poll, or Window-poll.
9. Window or Door-poll.
10. Wall-poll, or Wall-poll.
11. Gutter.
12. Gutter-beam, Gutter-poll, Window-beam, or Top beam.
13. Floor-board.
14. Principal Rafter.
15. Fitting, or Shoring.
16. End of the Limb, and Fitting.
17. Beaming, consisting of the Cornice over the Window, and Space between.
18. Rafter of the Principal Rafter, which are to be of one Piece.
19. Rafter Interval.

C H A P.

C H A P. XLVII.

Of the Design A.

A A
A B

THE Breadth of the House, *Cantilivers*, *Cornices*, and *Eaves*, the Length of the *Raftings*, and *Furrings*, which ought to be $\frac{3}{4}$ of the Breadth of the House A A.

The principal *Rafters* to be cut with a *Knee*, (as in the Design) that they may the better support themselves, and the Burthen over them, upon the Upright of the Wall, and also secure that part from the dripping in of the Rain; which otherwise would happen, if the *Rafters* were made Strait and Furred.

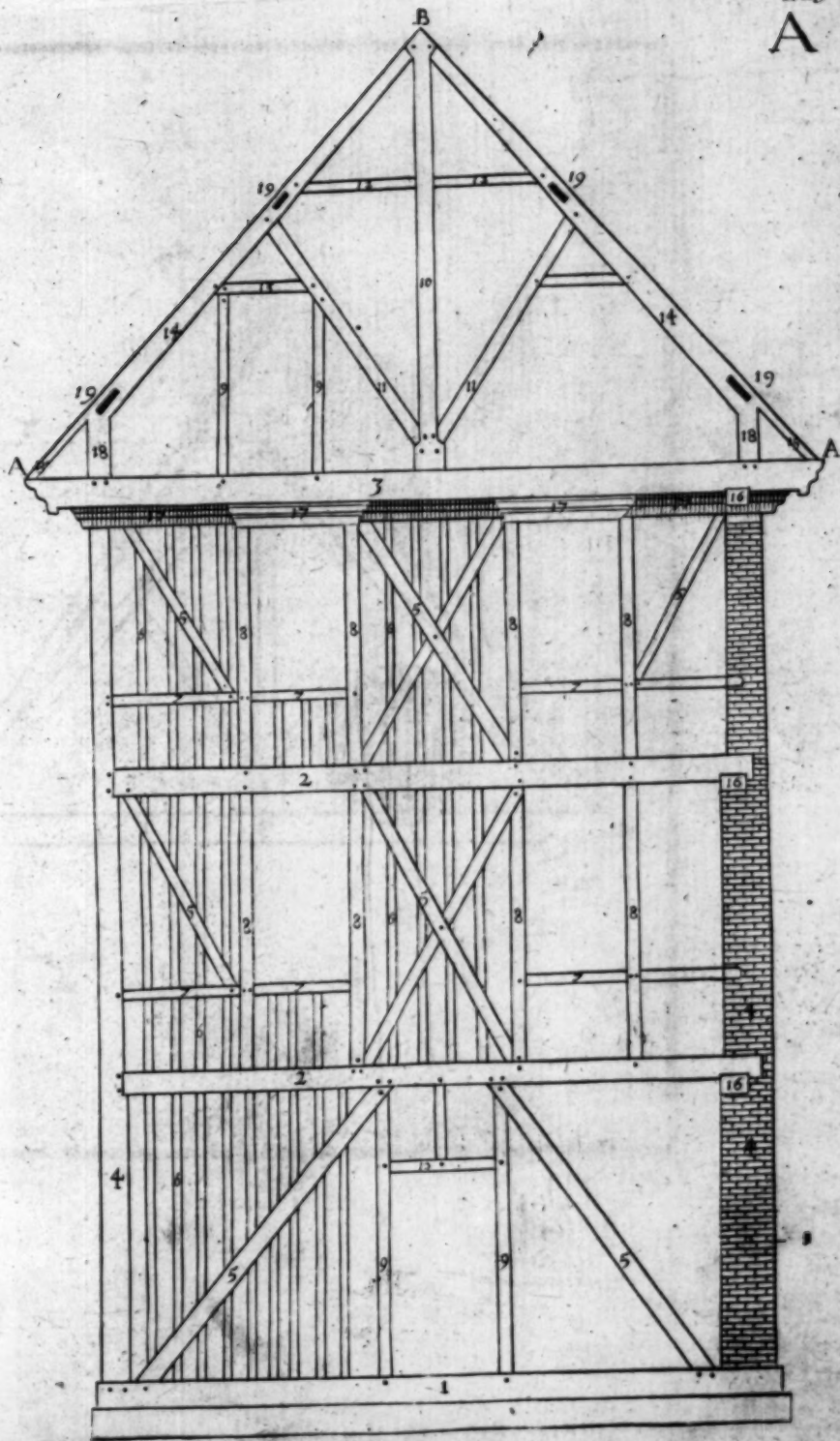
The Beam to the Roof, or Girder to the Garret-Floor, ought to Project without the Work as far as the Furring or Shreading, which is the *Projection* of the *Cornice*.

This Manner of Framing the Roof will be useful from 20 to 30 Foot, or thereabouts.

1. *Ground-plate.*
2. *Girder, or Binding Interduce, or Bressummer.*
3. *Beam to the Roof; or Girder to the Garret-Floor.*
4. *Principal Post, and Upright Brick-Wall.*
5. *Braces.*
6. *Quarters.*
7. *Interduces.*
8. *Prick-post, or Window-post.*
9. *Faums or Door-post.*
10. *King piece, or Joggle-piece.*
11. *Strutts.*
12. *Collar-beam, Strutt-beam, Wind-beam, or Top-beam.*
13. *Door-band.*
14. *Principal Rafters.*
15. *Furrings, or Shreadings.*
16. *Ends of the Lintels, and Pieces.*
17. *Bedding-moulding of the Cornice over the Windows, and Space between.*
18. *Knees of the Principal Rafters, which are to be of one Piece.*
19. *Purline Mortices.*

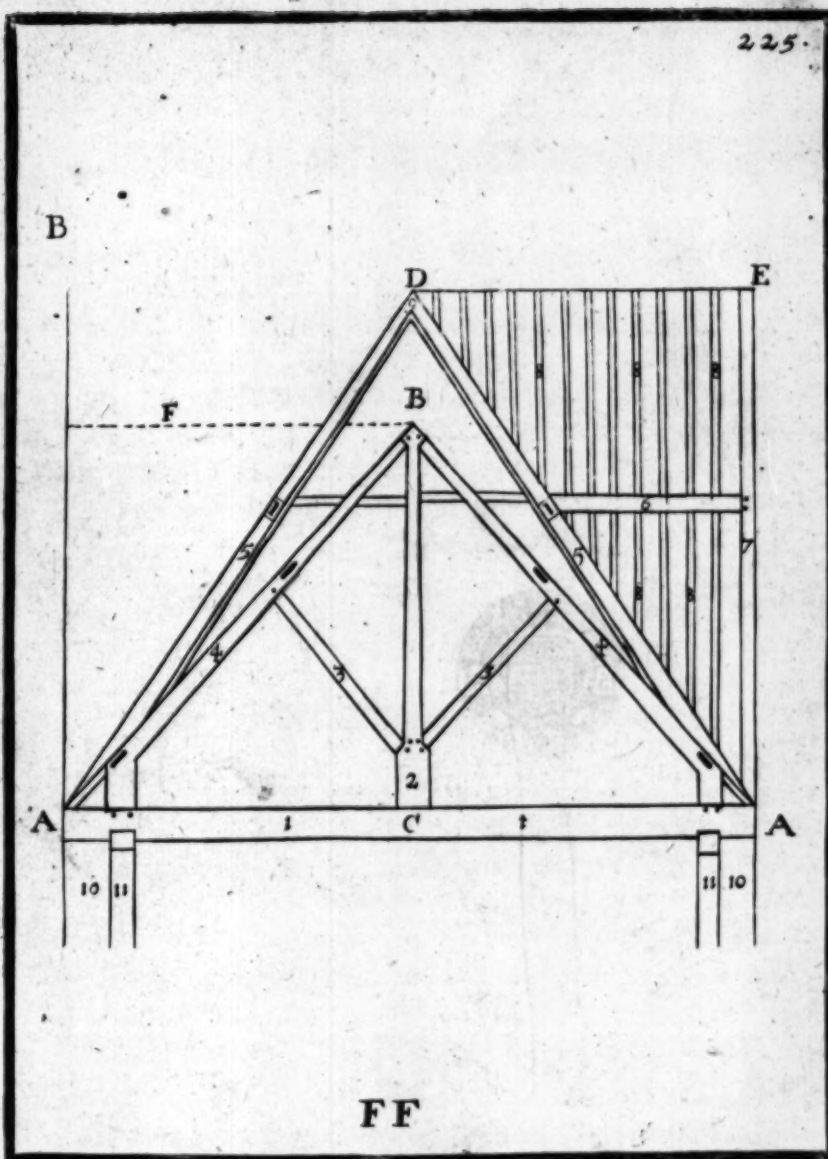
C H A P

A



A. C. H. A. P. XLVII







C H A P. XLVIII.

Design of the Gable-End or Roof B.

LET the whole breadth of the Gable-End or Roof A A be
 10: Foot divide the line into four equal Parts take
 the first three for the length of the Principal Rafter A B and
 placing that perpendicular from the Point C to the Point D
 begins the length of the Gutter A D which will be 12 Foot
 And the length of the Down-Principal Rafter from A to B
 when this Pitch upon the back of the Principal Rafter will
 reach to Level D B on top of the Principal Rafter; and
 this is a general Rule for all Gables.

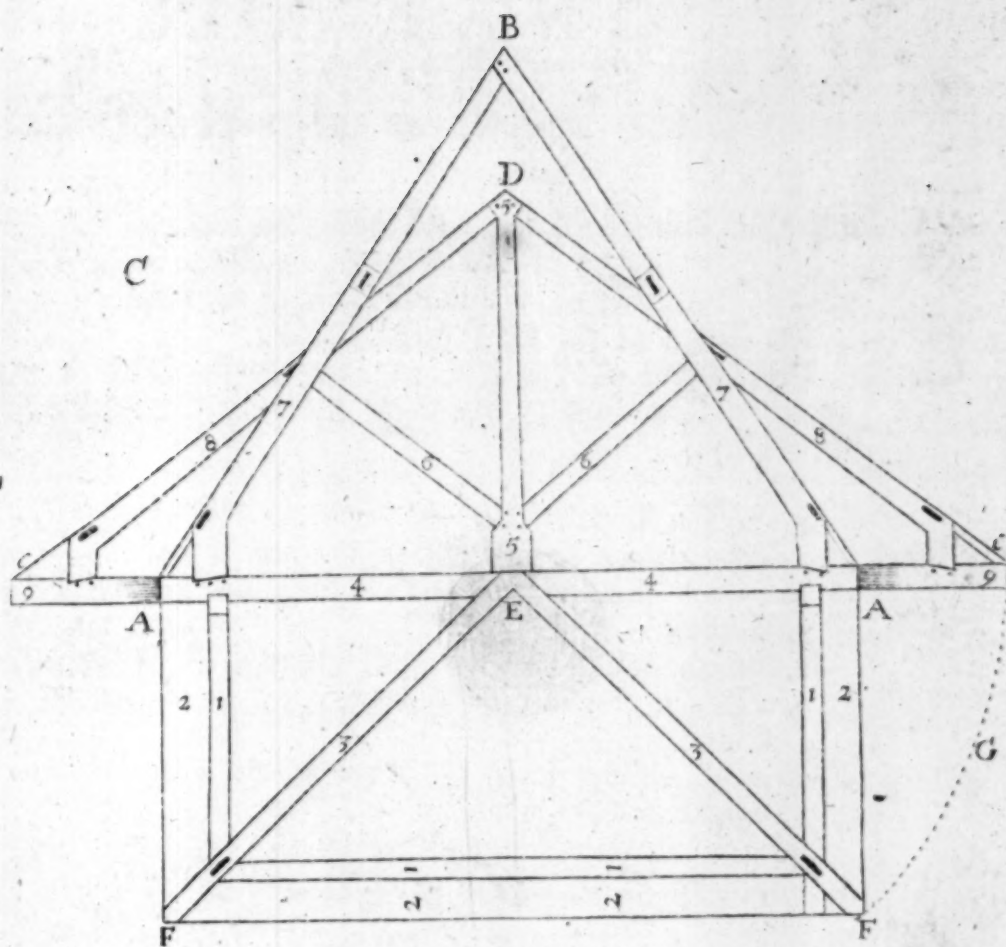
1. Summary or Plan.
2. Elevation of the Gable-End or Roof B.
3. Elevation of the Gutter.
4. Elevation of the Down.
5. The Slope.
6. Section of the Down.
7. Principal Rafter of the Down.
8. Small Rafter of the Down, standing on the Slope and
 Gutter.
9. Plan of the Down.
10. Plan of the Gable-End or Roof B.

C H A P. XLVIII.

Design of the Gable-End or Roof B.

LET the whole Breadth of the *Gable-End* or *Roof* A A be 20 Foot, divide the same into four equal Parts, take thereof three for the Length of the Principal Rafter A B, and placing that perpendicular from the Point C to the Point D, begets the Length of the *Sleeper* A D, which will be 18 Foot. And the Length of the *Dormers* Principal Rafter from A to E, when laid to its Pitch upon the back of the Principals, will reach to Level-line F B, or top of the Principal Rafter; and this is a general Rule for all Breadths.

1. *Summer or Beam.*
2. *King-piece, Crown-post, or Foggle-piece.*
3. *Braces or Strutts.*
4. *Principal Rafters.*
5. *The Sleeper.*
6. *Purline of the Dormer.*
7. *Principal Rafter of the Dormer.*
8. *Single Rafter of the Dormer, standing on the Sleeper and Purline.*
9. *Point of the Sleeper.*
- 10, 11. *The Thickness of the Wall and Lintels, or Wall-plates.*



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C H A P. XLIX.

Of the Italian or Hip-Roof.

THE Breadth of the Roof being 20 Feet.
The Length of the Slopes or Rafters being 18 Feet.
which is proportionable to the Breadth of the House.
The Height of the Roof perpendicular.
The Length of the Hip and the Angle which it makes
upon the Horizontal, which is shown by the Right-Line G
from F to C.

AA
AB
ED
CD

1. The Wall and Finials.
2. Dragon-beam for the Hip to stand on.
3. Rafter or Summer, between the Dragon-beams and framed.
4. Rafter from the Crown of the Hip.
5. Rafter or Rafter from the Crown of the Hip.
6. Hip, as they make the Angle equal to the Breadth of the House.
7. Hip, as they make the Angle on the Horizontal Line from Corner to Corner.
8. The Horizontal Rafter which the Hip makes upon the Horizontal, between the Breadth of the House.

C H A P. XLIX.

Of the Italian or Hip-Roof C.

- A A THE Breadth of the Roof, being 20 Foot.
 A B The Length of the *Sleepers* or *Hips*, being 18 Foot,
 which is proportionable to the Breadth of the House.
 E D The Height of the Roof perpendicular.
 C D The Length of the *Hip*, and the Angle which it maketh
 upon the *Diagonal-Line*, which is shewn by the Prick'd-line G,
 from F to C.

- 1, 2. *The Wall and Lintels.*
3. *Dragon-beam for the Hip to stand on.*
4. *Beam or Summer, wherein the Dragon-beams are framed.*
5. *King-piece or Crown-post.*
6. *Strutts or Braces from the Crown-posts to the Hip rafter.*
7. *Hips, as they make the Angle equal to the Breadth of the House.*
8. *Hips, as they make the Angle in the Diagonal Lines from Corner to Corner.*
9. *The Additional Length which the Hips make upon the Diagonal-Line, more than the Breadth of the House.*

C H A P. I.

Of Flat Roofs D.

Within a Chamber-beam and Rafter joisted in whole
 Weight hath not chiefly in the Middle, and may be
 to make that without hanging up the Beams, the Principals
 may discharge the Weight, and how Drips may be made to
 work on.

1. Chamber-beam.

2. Principals joisted into the Chamber-beam.

3. The Rafters where the Principals are joisted in.

4. Panchroom or Broom.

5. Drips for water on, and may be made with the left Current
 that the Roof may be made like water Pitches for the strongest
 and lowest: and may be made higher or lower, according
 to the building, and Direction of the Wind.

6. Broomhouse.

7. A Draught of a Flat-Roof with a Crown-
 Post, or King-Piece.

CHAP. L.

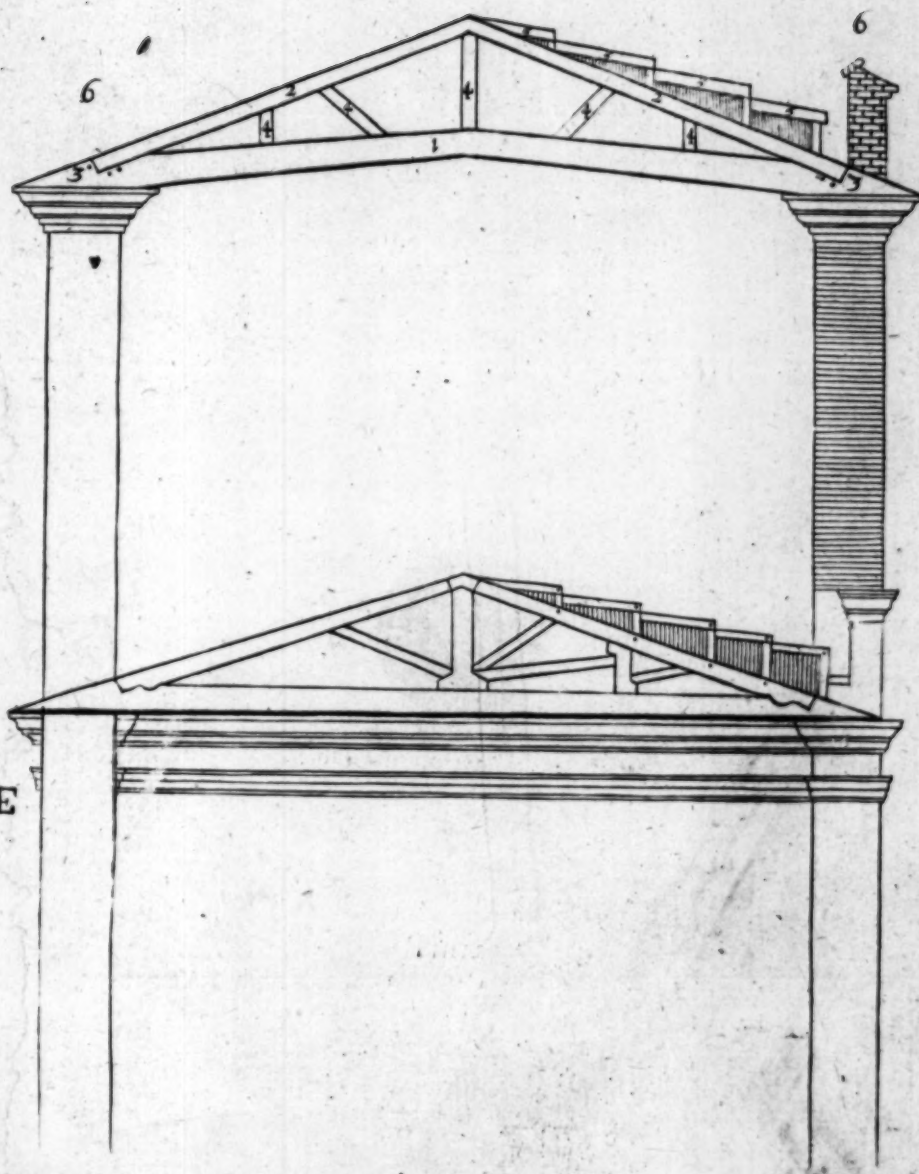
Of Flat Roofs D.

Within a *Chamber-beam* and *Rafters* joggled in, whose Weight lieth not chiefly in the Middle, and may be so made that without hanging up the Beam, the Principals may discharge the Weight; and how Drips may be made to walk on.

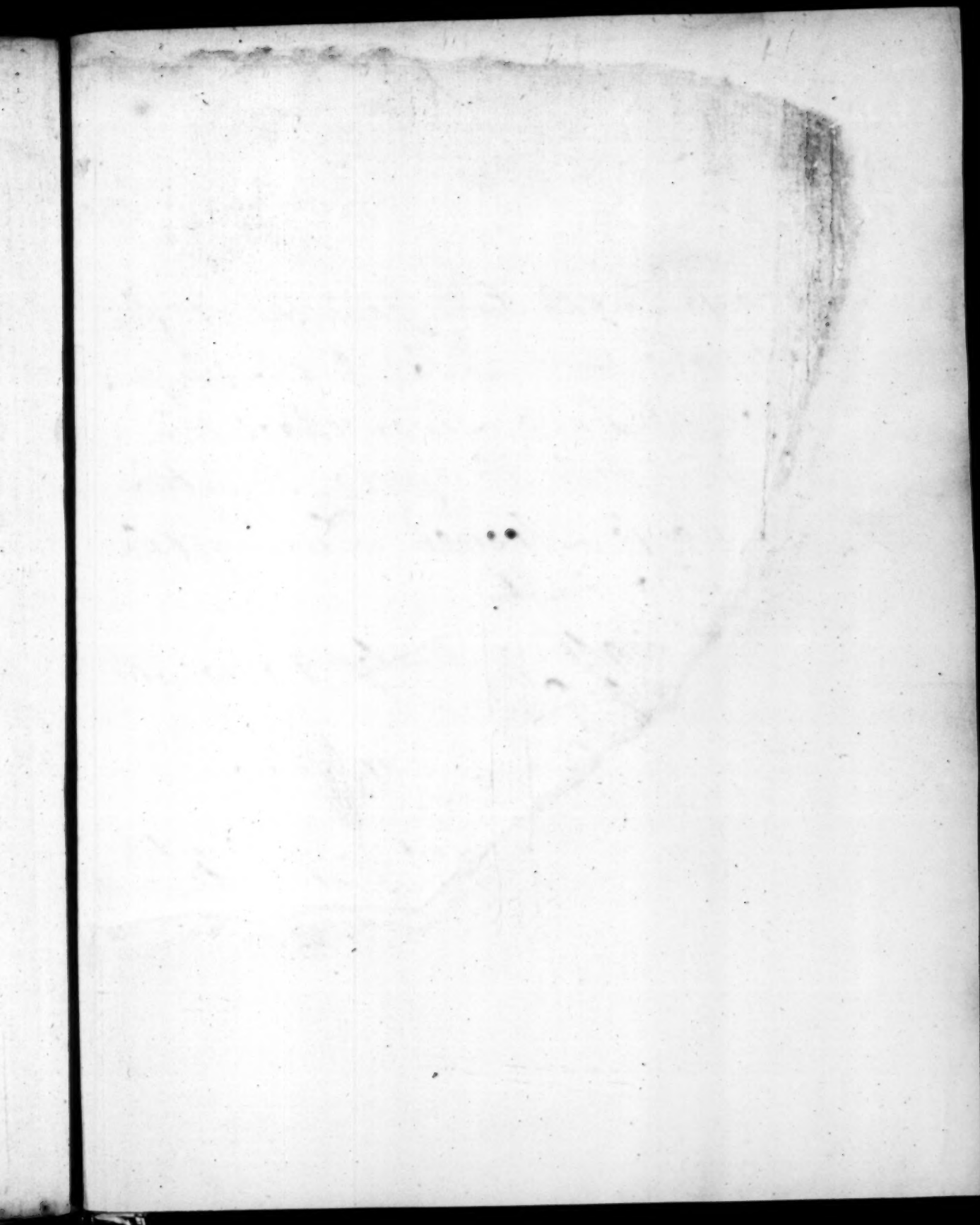
1. *Chamber-beam.*
2. *Principals joggled into the Chamber-beam.*
3. *The Place where the Principals are joggled in.*
4. *Puncheons or Braces.*
5. *Drips to walk on, and may be made with the less Current, that the Roof may be made the more Pitch, for the strengthening thereof: And may be made higher or lower, according to the Building, and Discretion of the Architect.*
6. *Battlements.*

 A Draught of a Flat-Roof, with a Crown-Post, or King-Piece.

D





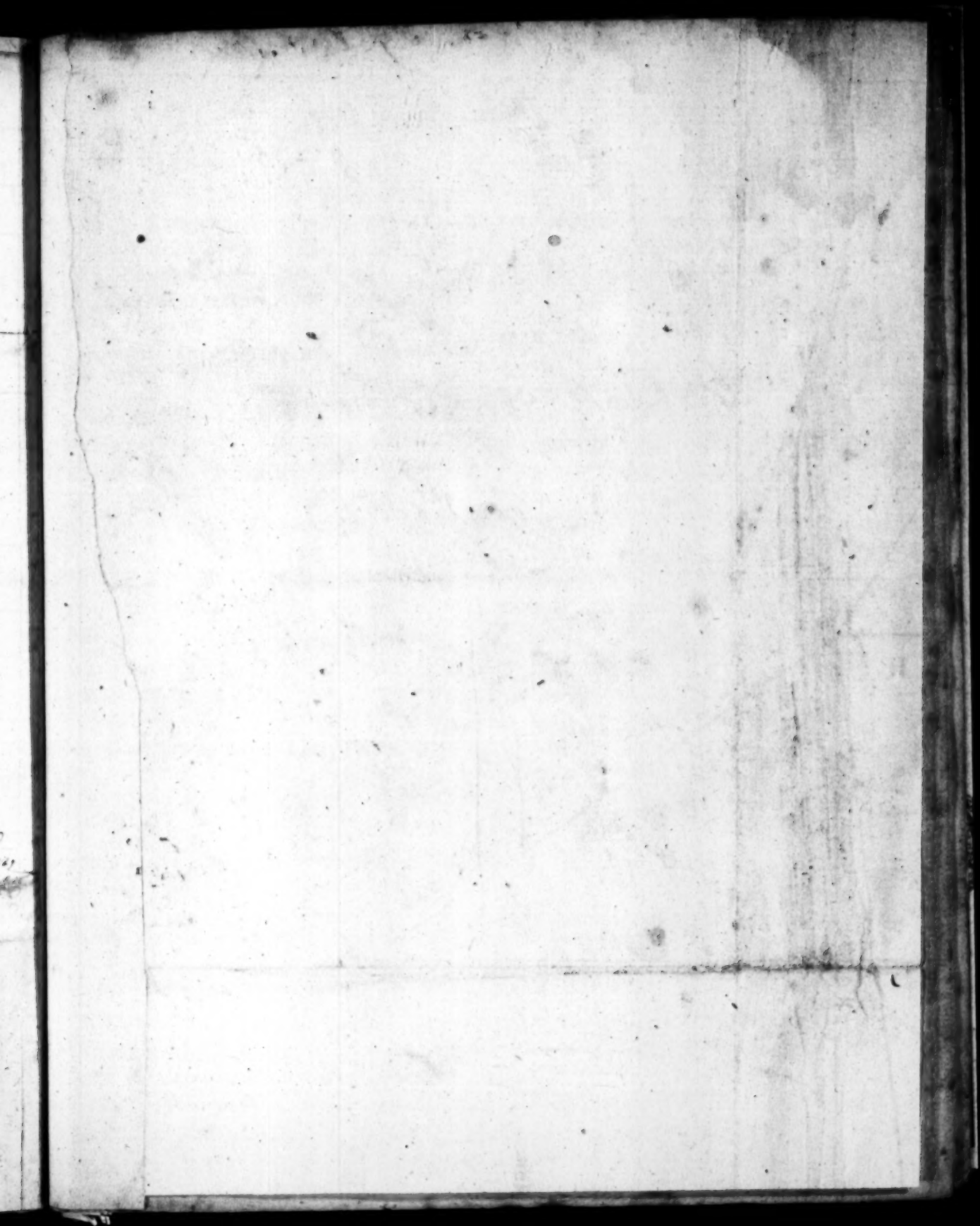


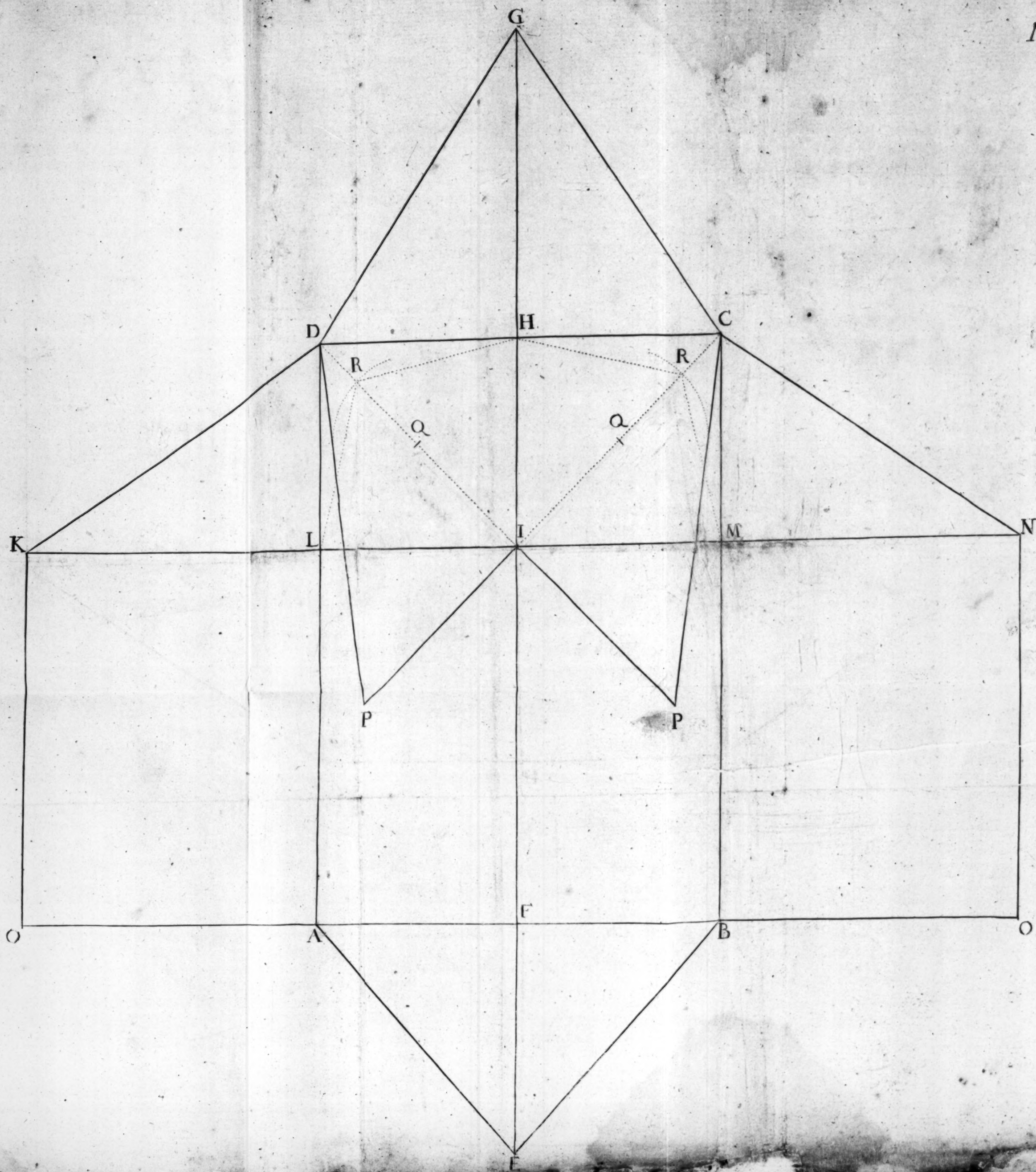
~~giving~~ edict by the said

said House to the said John Frost for
Frost have ~~been~~ Lived in the House
when he have Lived there the
the said John Frost to keep the
the House Licensed During the
Live in it

to ~~arrangings~~ making & what
the good

upper End of your ward
the hereby agree to
and Frost leaving them
want to have
the





E

CHAP. LI.

Of the Hip-Roof E.

I NSTRUCTIONS to find the Length and Back of the *Hip*, so as it may answer the Side and the End of the Perpendicular-line of the *Gable-End*, the two *Skirts*, the Side of the Roof in *Plano*, or lying in Ledge with the *Hip* and *Gable-End*; the Diagonal and Perpendicular-lines being laid down proportional to any Breadth or Length, by which the most Ingenious may serve himself; and an ordinary Capacity (already acquainted with the Use of the Ruler and Compass) may plainly demonstrate all the Parts of a Roof, whether *Square* or *Bevel*, *Above Pitch*, or *Under Pitch*, by Lines of Proportion, (as may appear in the Design following.)

Suppose the Roof 20 Foot Broad, and in Length 30, 40, or 50 Foot, more or less.

L ET ABCD be the Sides and Ends of the said Roof, one End to be *Hipt*, the other a *Gable-End*; draw the Lines ABCD the Breadth and Length of that Roof; then draw the *Gable-End* ABE, whose Sides or Principal Rafters being $\frac{1}{4}$ of the Breadth of the House; then draw the Perpendicular Line EF, the Height of the *Gable-End*, which Line is of general Use to level the Ridge of all Roofs; and if the other End be *Hipt*, as in the Design DCG, then it serves to find the Length of the *Hip*, and the Back of the *Hip*, so that it may answer both Sides and Ends of the Roof, always observing that the middle of the Breadth of the House is as IH; then draw the Line KLN through the Center I, which will make Right Angles to the Line EFHG both in *Bevel* and *Square* Houses; then extend the Line AB on both Sides to O, being the Length of AE or EB the Length of the Principal Rafters, or $\frac{1}{4}$ of the Breadth of the House; so will ON and OK make the Length of the Ridge IF, and KD and CN the two *Skirts*.

To find the Length of the Hip.

D Raw the Diagonal-line DI and IC, over which the *Hip* is to hang when in its due Place; then take the Perpendicular-

cular-line EF, and place it from the Point I to PP perpendicular to the Diagonal or Base Lines DI and IC at I; so is IP and IP the Pitch of the *Hip* equal to the *Gable-End* EF, and when erected, will hang perpendicular to the Point I; then take PD the Hypoteneuse of the Triangle DIP, and CP the Hypoteneuse of the Triangle CIP, placing them from D to G, and C to G, gives the Length of the *Hip* DGC; and when laid to their *Pitch*, will all meet perpendicular to the Point I.

To find the Back of the Hip, so that it may answer both Sides and Ends of the Roof, whether Square or Bevel.

LAY the Ruler from the Point L to the Point H, and from the Point H to M, and mark where it cuts the Diagonal Lines DI and IC at QQ; then set one Foot of the Compasses on the Point Q, and extend the other Foot to the *Hip* Lines DP and CP at the nearest Distance, with that mark the Point R upon the same Diagonal Lines; then draw the prick'd-Lines LRH and HRM, which make the Back of the *Hip* for the two Corners of that Roof.

This Rule serves for all Roofs, whether Over or Under Pitch.

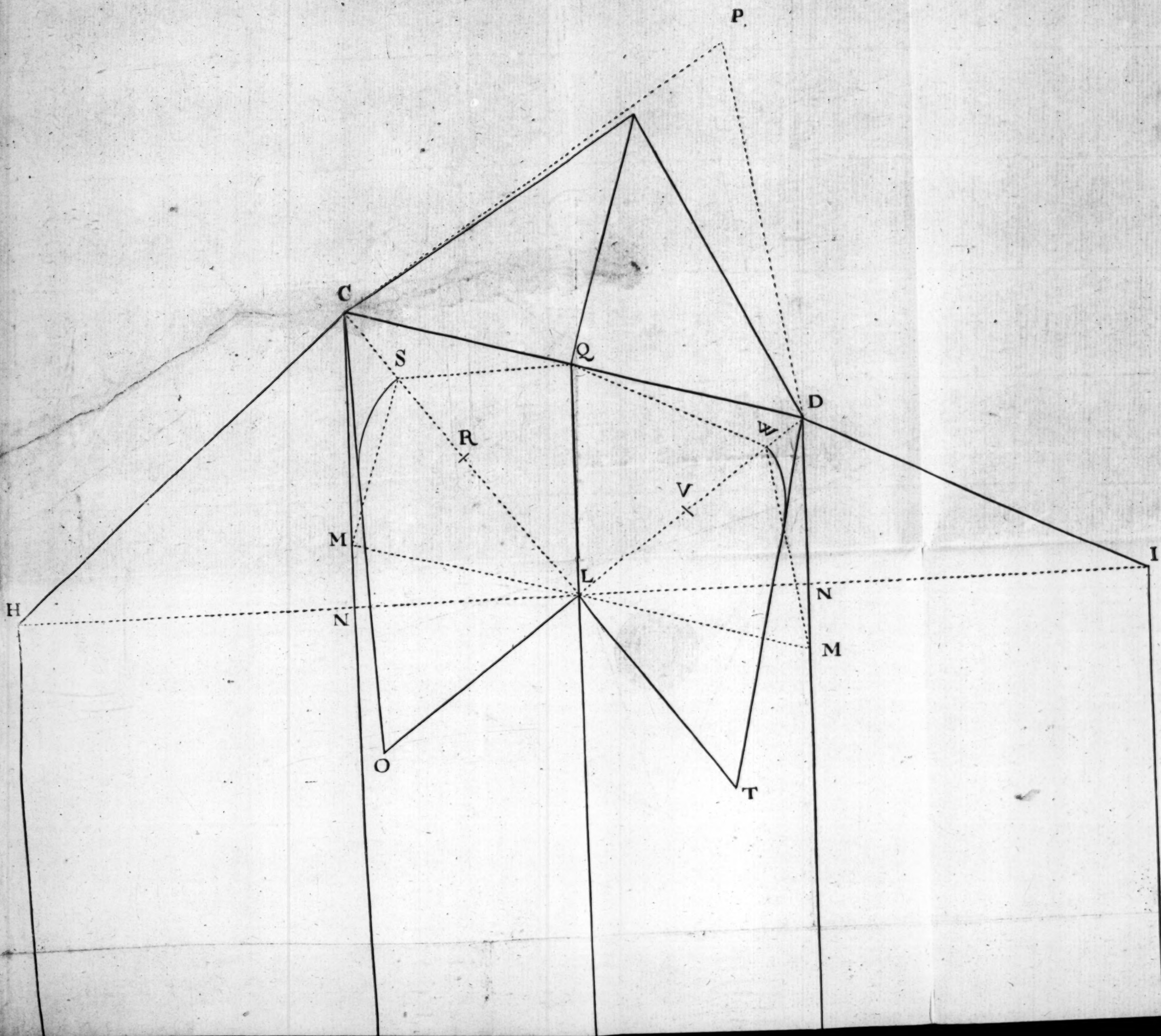
C H A P. LII.

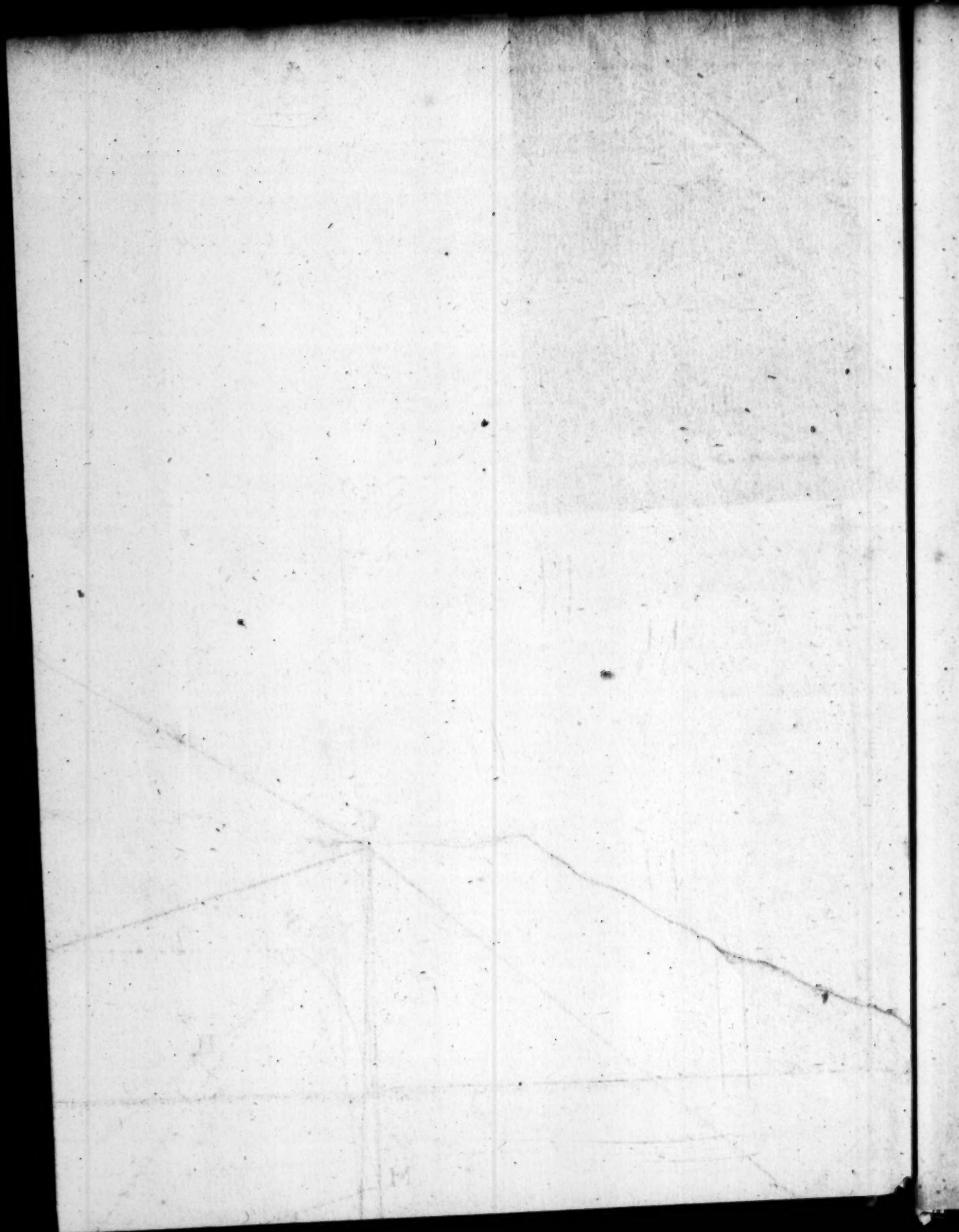
Of the Roof Bevel at one End, and Square at the other; the Gable-End Square, the Bevel-End Hipt.

SUPPOSE the Breadth of the Roof 20 Foot, the Length more on one Side than on the other, as in the Design ABCD; then draw the *Gable-End* AEB, whose Sides from A to E and from E to B is $\frac{1}{2}$ of the Breadth of the House, or is the Length of the Principal Rafters; then draw the Perpendicular EF, the Height of the Roof from the Floor; and if Knee'd, then from the top of the Knee, (as in the Design of a Knee'd Rafter foregoing.)

The Sides of the Roof which make the Ridge GHK, to be drawn as is describ'd in the foregoing Design.

Divide





Of Architecture.

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Divide the Breadth of the Roof into two equal Parts, as FLQ; then take the Distance LN, which is the $\frac{1}{2}$ Breadth of the House, and make it parallel to CQD, as MLM and L will be the Point whose Perpendiculars OT will meet the Principal Rafters and Hips.

*To find the Length of each Hip distinct one from the other.
Of the longest Hips.*

DRAW the Diagonal Line LC, and take the Height of the Gable-End EF, and place it perpendicular to LC at O, so have you the Height of the Roof perpendicular from OL equal to EF, the Gable-End; and the Line OC will be the Length of the Hip-Rafter, which will be equal to CH the Skirt for that Side of the Hip, and CP the Side of that Hip End.

To find the Back of the longest Hip CO.

LAY the Ruler from the Point M to Q, and mark where it cuts the Diagonal-line at R; then set one Foot of the Compasses at the Point R, and extend the other Foot 'till it touch the Line CO at the nearest Distance; then make it touch the Diagonal-line at S; then draw the Lines MSQ, which is the Back of the Hip, for that Corner of the Roof.

To find the shortest Hip.

DRAW the Diagonal-line of LD, and take EF the Perpendicular of the Gable-End (as before,) and place it from L to T perpendicular to LD: Then draw the Line TD, which is the Length of the Hip for that Corner, and is equal to the Skirt DI, and the Side of that Hip DP, which when erected, will meet with the other Principals perpendicular to the Point L.

To find the Back of this Hip.

LAY the Ruler from the Point Q to the Point M, and mark where it cuts the Diagonal-line LD at V; extend the Compasses from the Point V to touch the Line TD at the nearest Distance, and carry that Distance on the Diagonal-line to the Point W; then draw the prick'd Lines MWQ, which will make the Back of that Hip fit for that Bevel Corner.

And this Rule serves for all Bevel Roofs, Under or Over Pitch.

C H A P.

CHAP. LIII. G.

Of a Roof Bevel at both Ends, and
Broader at one End than the other.

- ABCD. THE Length and Breadth of the House.
 EFG. The Length of the Rafters or *Pitch* between the widest and narrowest End, about the middle of the House, to stand over the prick'd Line TT, as the Foot F to stand on the one T, the Foot G to stand on the other T.
 HH. The Point of the two *Hip-Ends*, when brought to their due Place, will be perpendicular to PP, and will meet the Sides IKLM over the Points PP.
 OOOO. The Points of the Perpendiculars and Length of the *Hips* from ABCD.
 QQQQ. The Backs of the *Hips* or *Hip-Mould* due to each Corner.
 RRRR. The Points to find out Q, the Points for each Backs.
 SSSS. The Lines representing $\frac{1}{2}$ the Breadth of the House parallel to each End.
 TT. Representing the Middle of the House.

Notwithstanding the *Bevel-Ends*, you may place your Beams for your Principal Rafters to stand on Square, or so near a Square as may be, or between both, as from the Ends of the prick'd Lines IKLM, bringing the outside of them straight under P, which will be more handsome for the House in the Inside, altho' it *Bevels* Outward.



